



April 30, 2026

CALL AND NOTICE OF A REGULAR MEETING
OF THE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY

NOTICE is hereby given that a regular meeting of the Burbank-Glendale-Pasadena Airport Authority will be held on Monday, May 4, 2026 at 9:00 a.m., in the Airport Skyroom of Hollywood Burbank Airport, 2627 N. Hollywood Way, Burbank, California 91505.

In addition to attending the meeting in person, members of the public may observe the meeting telephonically and may offer comment in real time through the following number:

Dial in: (818) 862-3332

Terri Williams, Board Secretary
Burbank-Glendale-Pasadena Airport Authority

BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY

Regular Meeting of May 4, 2026

9.00 A.M.

The public comment period is the opportunity for members of the public to address the Commission on agenda items and on Airport-related non-agenda matters that are within the Commission's subject matter jurisdiction. At the discretion of the presiding officer, public comment on an agenda item may be presented when that item is reached.



Members in-person attendance or participation at meeting of the Commission is allowed, members of the public are requested to observe the following rules of decorum:

- *Turn off cellular telephones and pagers.*
- *Refrain from disorderly or boisterous conduct, including loud, threatening, profane, or abusive language, clapping, whistling, stamping, or other acts that disrupt or otherwise render unfeasible the orderly conduct of the meeting.*
- *If you desire to address the Commission during the public comment period, fill out a speaker request card and present it to the Board Secretary.*
- *Confine remarks to agenda items or to Airport-related non-agenda matters that are within the Commission's subject matter jurisdiction.*
- *Limit comments to three minutes or to such other period of time as may be specified by the presiding officer.*



The following activities are prohibited:

- *Allocation of speaker time to another person.*
- *Video presentations requiring use of Authority equipment.*



Any disclosable public records related to an open session item on a regular meeting agenda and distributed by the Authority to the Commission less than 72 hours prior to that meeting are available for public inspection at Hollywood Burbank Airport (2627 N. Hollywood Way, Burbank) in the administrative office during normal business hours.



In accordance with the Americans with Disabilities Act of 1990, if you require a disability-related modification or accommodation to attend or participate in this meeting, including auxiliary aids or services, please call the Board Secretary at (818) 840-8840 at least 48 hours prior to the meeting.

AGENDA

Monday, May 4, 2026

1. ROLL CALL
2. PLEDGE OF ALLEGIANCE
3. APPROVAL OF AGENDA
4. PUBLIC COMMENT (Public comment will be limited to a total of 20 minutes at the beginning of the meeting and will continue at the conclusion of the meeting, if necessary. Comments are limited to 3 minutes each, and the Authority President may limit this time if reasonable under the circumstances.)
5. CONSENT CALENDAR (Includes Minutes. Items on the Consent Calendar are generally routine in nature and may be acted upon by one motion unless removed for separate consideration.)
 - a. Committee Minutes
(For Note and File)
 - 1) Operations and Development Committee
 - (i) April 6, 2026 **[See page 1]**
 - (ii) March 16, 2026 **[See page 2]**
 - 2) Finance and Administration Committee
 - (i) April 6, 2026 **[See page 4]**
 - 3) Legal, Government and Environmental Affairs Committee
 - (i) March 16, 2026 **[See page 7]**
 - b. Commission Minutes
 - 1) April 20, 2026 **[See page 9]**
 - c. Award of Concession Agreement
Automated Teller Machine – BaumTech LLC **[See page 15]**
 - d. Award of Contract
ADK Consulting, Inc. **[See page 18]**
6. ITEMS FOR COMMISSION APPROVAL
 - a. On-Call Pavement Improvement Contract Award and Task Order Approval – On-Call Architectural and Engineering Contract Task Order Approval Southeast Quadrant Reconfiguration Project **[See page 19]**

b. Perimeter Intrusion Detection System Equipment Replacements ***[See page 23]***

7. ITEMS PULLED FOR DISCUSSION

8. EXECUTIVE DIRECTOR COMMENTS

9. COMMISSIONER COMMENTS

(Commissioners may make a brief announcement, make a brief report on their activities, and request an agenda item for a future meeting.)

10. PUBLIC COMMENT

11. ADJOURNMENT: To May 18, 2026, for the next regularly scheduled meeting of the Burbank-Glendale-Pasadena Airport Authority, 2627 N Hollywood Way, Skyroom

COMMISSION NEWSLETTER

Monday, May 4, 2026

[Regarding agenda items]

5. CONSENT CALENDAR

(Consent Calendar items may be enacted by one motion. There will be no separate discussion on these items unless a Commissioner so requests, in which event the item will be removed from the Consent Calendar and considered in its normal sequence on the agenda.)

- a. COMMITTEE MINUTES. Copies of the approved minutes of the Operations and Development Committee meetings of April 6, 2026, and March 16, 2026; a copy of the approved minutes Finance and Administration Committee meeting of April 6, 2026; and a copy of the approved minutes of the Legal, Government and Environmental Affairs Committee meeting of March 16, 2026, are included in the agenda packet for information purposes.
- b. COMMISSION MINUTES. A draft copy of the April 20, 2026, meeting Commission minutes are included in the agenda packet for review and approval.
- c. AWARD OF CONCESSION AGREEMENT – AUTOMATED TELLER MACHINE BAUMTECH, LLC. A staff report is included in the agenda packet. At its meeting on April 20, 2026, the Finance and Administration Committee voted (3-0) to recommend that the Commission approve a proposed Automated Teller Machine Concession Agreement with BaumTech, LLC, for the installation, operation and management of two Automated Teller Machines at the Replacement Passenger Terminal.
- d. AWARD OF CONTRACT – ADK CONSULTING, INC. A staff report is included in the agenda packet. This item seeks Commission approval of a professional services agreement with ADK Consulting, Inc., for executive search and consulting services for the Executive Director position when the incumbent leaves office in the first quarter of 2027.

6. ITEMS FOR COMMISSION APPROVAL

- a. ON-CALL PAVEMENT IMPROVEMENT CONTRACT AWARD AND TASK ORDER APPROVAL – ON-CALL ARCHITECTURAL AND ENGINEERING CONTRACT TASK ORDER APPROVAL SOUTHEAST QUADRANT RECONFIGURATION PROJECT (“SEQ”). A staff report is included in the agenda packet. At its meeting on April 20, 2026, the Operations and Development Committee voted (2-0, 1 absent) to: (i) award an On-Call Pavement Improvement Agreement to Griffith Company in a not-to-exceed amount of \$2,500,000 for a one-year term with two one-year extension options at the discretion of the Authority; (ii) pre-authorize the Executive Director to issue Griffith a task order in a not-to-exceed amount of \$1,000,000 for time sensitive pavement work for the Southeast Quadrant Reconfiguration Project upon receipt of the accepted final scope and quantities; (iii) authorize the Executive Director to issue HNTB Corporation, the Authority’s existing on-call architectural and engineering services consultant, a task order in a not-to-exceed amount of \$125,000 for project management and construction management support for the

SEQ Reconfiguration Project; and (iv) authorize Staff to file a CEQA Notice of Exemption for the SEQ Reconfiguration Project.

- b. PERIMETER INTRUSION DETECTION SYSTEM EQUIPMENT REPLACEMENTS. A staff report is included in the agenda packet. Subject to the recommendation of the Operations and Development Committee at its meeting immediately preceding the Commission meeting, Staff seeks the Commission to approve the purchase and installation of replacement equipment for the Airport Perimeter Intrusion Detection System and its associated thermal cameras. The current equipment, originally installed in 2009, is no longer supported by the manufacturer and an upgrade is necessary to ensure compatibility and connectivity with the Replacement Passenger Terminal system.

The proposed cost for the acquisition and installation of the equipment is \$125,637.99. Staff seeks an additional 10% project contingency in the amount of \$18,500 for unforeseen circumstances during installation for a total project cost of \$144,137.99.

**MINUTES OF THE REGULAR MEETING OF THE
OPERATIONS AND DEVELOPMENT COMMITTEE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY**

MONDAY, APRIL 6, 2026

The regular meeting of the Operations and Development Committee on this date in the Airport Skyroom, 2627 N. Hollywood Way, Burbank, California, at 8:30 a.m., was cancelled due to a lack of quorum.

**MINUTES OF THE REGULAR MEETING OF THE
OPERATIONS AND DEVELOPMENT COMMITTEE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY**

MONDAY, MARCH 16, 2026

A regular meeting of the Operations and Development Committee was called to order on this date in the Airport Skyroom, 2627 N. Hollywood Way, Burbank, California, at 8:37 a.m., by Commissioner Hampton.

1. ROLL CALL

Present: Commissioners Talamantes and Hampton

Absent: Commissioner Asatryan

Also Present: Staff: John Hatanaka, Executive Director;
Scott Kimball, Deputy Executive Director,
Business Development

Raymond Whitmer, VP, Teamsters Local 986;
John Baumgardner, CEO, Ace Parking III, LLC

2. Approval of Agenda

Motion Commissioner Talamantes moved approval of the agenda; seconded by Commissioner Hampton.

Motion Approved The motion was approved (2-0,1 absent).

3. Public Comment

There were no public comments.

4. Approval of Minutes

a. January 20, 2026

The agenda packet included draft copies of the January 20, 2026, and February 17, 2026, special Committee meeting minutes for review and approval.

b. February 17, 2026

Motion Commissioner Talamantes moved approval of the minutes; seconded by Commissioner Hampton.

Motion Approved The motion was approved (2-0,1 absent).

5. Items for Approval

a. Preliminary Budget Authorizations for ACE Parking - Lease of Additional Buses; Change to Employee Medical Program

Staff sought an Operations and Development Committee recommendation to the Commission to grant preliminary budget authorizations to ACE Parking III, LLC ("ACE") for a lease of eight 40-foot CNG shuttle buses and for a change in medical benefits for ACE employees. The additional buses are needed to address changes in courtesy shuttle operations that will occur upon opening of the Replacement Passenger Terminal in October 2026. The change in medical benefits reflects ACE's updated collective bargaining agreement with Teamsters Local 986.

Motion

The Committee voted to recommend approval of the preliminary budget authorizations to ACE for the lease of eight 40-foot CNG shuttle buses.

The Committee did not recommend approval of the change to the employee medical program, pending further discussion and additional information.

Motion Approved

The motion was approved (2-0,1 absent).

6. Items for Information

a. Committee Pending Items

Staff informed the Committee of future pending items that will come to the Committee for review.

7. Adjournment

There being no further business to discuss, the meeting was adjourned at 9:01 a.m.

**MINUTES OF THE REGULAR MEETING OF THE
FINANCE AND ADMINISTRATION COMMITTEE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY**

MONDAY, APRIL 6, 2026

A regular meeting of the Finance and Administration Committee was called to order this date in the Airport Skyroom, 2627 N. Hollywood Way, Burbank, California, at 11:02 a.m., by Commissioner Wilson.

1. ROLL CALL

Present: Commissioners Wilson, Ovrom and Quintero

Absent: None

Also Present: Staff: John Hatanaka, Executive Director; Kathy David, Senior Deputy Executive Director; David Kwon, Deputy Executive Director, Finance and Administration; Thomas Henderson, Director, Business & Properties; Madeleine Zavala, Senior Manager, Business & Properties

2. Staff Announcement: AB 23

The Executive Director announced that, as a result of the convening of this meeting of the Finance and Administration Committee, each Committee member in attendance is entitled to receive and shall be provided \$200.

3. Approval of Agenda

The agenda was approved as presented.

Motion

Commissioner Quintero moved approval; seconded by Commissioner Ovrom.

Motion Approved

The motion was approved (3–0).

4. Public Comment

There were no public comments.

5. Approval of Minutes

a. March 23, 2026

A draft copy of the minutes of the special meeting of March 23, 2026, was included in the agenda packet for review.

b. March 16, 2026

A draft copy of the minutes of the regular meeting of March 16, 2026, was included in the agenda packet for review.

Motion

Commissioner Quintero moved approval of the minutes; seconded by Commissioner Ovrom.

Motion Approved

The minutes were approved (3–0).

6. Treasurer's Report

a. January 2026

A draft copy of the January 2026 Treasurer's Report was included in the agenda packet for the Committee's review.

Motion

Commissioner Quintero moved approval to note and file the Treasurer's Reports; seconded by Commissioner Ovrom.

Motion Approved

The motion was approved (3–0).

7. Items for Approval

a. Month-to-Month Lease Template – Replacement Passenger Terminal

Staff presented to the Committee a recommendation for Commission approval of a Month-to-Month lease template for the Replacement Passenger Terminal and authorization for the Executive Director to execute individual Month-to-Month leases with tenants, substantially in the approved form. The authorization includes discretion for the Executive Director to make space-specific modifications that do not result in a material negative financial impact on the Authority, as well as clerical or non-substantive revisions as deemed necessary by Authority General Counsel.

The Committee recommended certain modifications to the staff report before submission to the Commission.

Motion

Commissioner Ovrom moved approval; seconded by Commissioner Quintero.

Motion Approved

The motion was unanimously approved (3–0).

b. Third Amendment to Lease Agreement – HERC Rentals, Inc.

Staff presented to the Committee a recommendation for Commission approval a Third Amendment to the January 17, 2006 Lease Agreement between Herc Rentals, Inc. and the Authority, which provides for a five-year lease extension with one additional five-year extension option. As a condition of the Amendment, Herc Rentals is required to construct and install a block wall along a portion of its leasehold perimeter. The lease extension is contingent upon Herc Rentals obtaining a building permit for the block wall no later than August 1, 2026.

The Committee recommended certain modifications to the staff report before submission to the Commission.

Motion

Commissioner Ovrom moved approval; seconded by Commissioner Quintero.

Motion Approved

The motion was unanimously approved (3–0).

**c. Access Agreement
BUR Fuel Company, LLC**

Staff presented to the Committee a recommendation for Commission approval a proposed Access Agreement with BUR Fuel Company, LLC (“BUR Fuel”) for BUR Fuel’s temporary access and use of the Authority’s property for the purpose of performing geotechnical and surveying services in connection with the evaluation of the Fuel Farm Expansion Project.

Motion

Commissioner Quintero moved approval; seconded by Commissioner Ovrom.

Motion Approved

The motion was unanimously approved (3–0).

**d. Replacement Passenger
Terminal Program Manager
Jacobs Project Management
Company - Task Order
Authorization**

Staff presented to the Committee a recommendation for Commission approval of Task Order No. 6 with Jacobs Project Management Co. in the amount of \$7,859,872 to provide program management services for the Replacement Passenger Terminal Project. This includes approval to extend the Jacobs contract expiration date from May 11, 2027, to May 1, 2028, and to increase the original maximum contract value to align with the anticipated duration of the legacy facility demolition, required additional services, and overall project closeout.

Motion

Commissioner Quintero moved approval; seconded by Commissioner Ovrom.

Motion Approved

The motion was unanimously approved (3–0).

8. Items for Discussion

**a. Proposed FY 2027 Capital
Projects Including RPT
Construction Forecast**

Staff presented to the Committee highlights of Capital Projects and the Replacement Passenger Terminal.

9. Items for Information

a. Committee Pending Items

Staff reviewed future items to be presented to the Committee.

10. Adjournment

The meeting was adjourned at 12:19 p.m.

Adjournment: To April 20, 2026, for the next scheduled meeting of the Burbank-Glendale-Pasadena Airport Authority Finance and Administration Committee – 2627 Hollywood Way, SkyRoom.

**MINUTES OF THE REGULAR MEETING OF THE
LEGAL, GOVERNMENT AND ENVIRONMENTAL AFFAIRS COMMITTEE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY**

MONDAY, MARCH 16, 2026

A regular meeting of the Legal, Government and Environmental Affairs Committee was called to order on this date in the Burbank Room, 2627 N. Hollywood Way, Burbank, California, at 8:40 a.m., by Commissioner Gabel-Luddy.

1. ROLL CALL

Present: Commissioners Gabel-Luddy, Najarian, and Lyon (arrived at 8:43 a.m.)

Absent: None

Also Present: Patrick Lammerding, Deputy Executive Director, Operations, Security, and SMS; Greg Rabinovitz, Chief of Staff; Maggie Martinez, Director, Noise and Environmental Affairs

Authority Counsel: Terence Boga, Esq.,
Richards, Watson & Gershon

2. Approval of Agenda

Motion Commissioner Najarian moved approval of the agenda; seconded by Commissioner Gabel-Luddy.

Motion Approved The motion was approved (2–0, 1 absent).

3. Public Comment

There were no public comments.

4. Approval of Minutes

a. February 17, 2026

The agenda packet included a draft copy of the February 17, 2026, special Committee meeting minutes for review and approval.

Motion Commissioner Najarian moved approval of the minutes; seconded by Commissioner Gabel-Luddy.

Motion Approved The motion was approved (2–0, 1 absent).

5. Items for Approval

- a. Annual CPI Adjustments to Noise Fine** In accordance with the annual adjustment of noise violation fines required by Resolution No. 382, Staff sought a Legal, Government and Environmental Affairs Committee recommendation to the Commission to authorize an increase to the noise fines associated with certain restricted operations as detailed in Airport Noise Rules 8 and 9.

Motion

Commissioner Lyon moved approval of the recommendation; seconded by Commissioner Najarian.

Motion Approved

The motion was approved (3–0)

6. Items for Discussion

- a. Advanced Air Mobility (AAM) Integration Pilot Program (eIPP) Letter Review**

Staff presented for discussion a draft letter of commitment in response to a request from the County of Ventura Department of Airports for the inclusion of the Hollywood Burbank Airport in their proposed submittal to the Federal Aviation Administration's Electric Vertical Take-Off and Landing Integration Pilot Program.

The Committee voted in favor of the proposed letter of commitment with continued updates.

Motion

Commissioner Najarian moved approval; seconded by Commissioner Lyon.

Motion Approved

The motion was approved (3–0)

- b. Committee Pending Items**

This item was not discussed.

7. Adjournment

The meeting was adjourned at 8:53 a.m.

**MINUTES OF THE REGULAR MEETING OF THE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY**

MONDAY, APRIL 20, 2026

A regular meeting of the Burbank-Glendale-Pasadena Airport Authority was called to order on this date in the Airport Skyroom, 2627 N. Hollywood Way, Burbank, California, at 9:09 a.m., by President Talamantes.

1. ROLL CALL

Present: Commissioners Talamantes, Hampton, Quintero, Najarian, Ovrom, Wilson, Gabel-Luddy (Participated via teleconference. Reason being "just cause")

Commissioner Gabel-Luddy participated in the meeting remotely via teleconference pursuant to Government Code section 54950, SB 707, due to just cause as defined in AB 2449 for a family medical emergency. The commissioner participated in discussion and voting as if physically present.

Absent: Lyon, Asatryan

Also Present: Staff: John Hatanaka, Executive Director; Lewis Pianka, Airport Fire Chief; Maggie Martinez, Director, Noise & Environmental Affairs

Louis Choi, Public Resource Advisory Group

2. PLEDGE OF ALLEGIANCE

Commissioner Talamantes led the Pledge of Allegiance.

3. APPROVAL OF AGENDA

The agenda was approved as presented.

Motion Commissioner Quintero moved approval of the agenda; seconded by Commissioner Hampton.

Motion Approved The motion was approved (7–0, 2 absent).

AYES: Hampton, Quintero, Najarian, Ovrom, Lyon, Wilson, Gabel-Luddy (via teleconference)

NOES: None

ABSENT: Lyon, Asatryan

4. PUBLIC COMMENT

(Public comment will be limited to a total of 20 minutes at the beginning of the meeting and will continue at the conclusion of the meeting, if necessary. Comments are limited to 3 minutes each, and the Authority President may limit this time if reasonable under the circumstances.) None

5. CONSENT CALENDAR

(Includes Minutes. Items on the Consent Calendar are generally routine in nature and may be acted upon by one motion unless removed for separate consideration.)

a. Committee Minutes (For Note and File)

1) Finance and Administration Committee

(i) March 23, 2026

Approved minutes of the March 23, 2026, Finance and Administration Committee special meeting were included in the agenda packet for information purposes

(ii) March 16, 2026

Approved minutes of the March 16, 2026, Finance and Administration Committee meeting were included in the agenda packet for information purposes.

2) Legal, Government and Environmental Affairs Committee

(i) March 16, 2026

Approved minutes of the March 16, 2026, Legal, Government and Environmental Affairs Committee meeting were included in the agenda packet for information purposes.

b. Commission Minutes

1) April 6, 2026

A draft copy of the minutes of the Commission meeting of April 6, 2026, was included in the agenda packet for review and approval.

c. Treasurer's Report

1) January 2026

At its meeting on April 6, 2026, the Finance and Administration Committee voted (3–0) to recommend that the Commission notes and file these reports.

d. Month-to-Month Lease Template Replacement Passenger Terminal

At its meeting on April 6, 2026, the Finance and Administration Committee unanimously voted (3–0) to recommend that the Commission approve a Month-to-Month Lease Template for the Replacement Passenger Terminal and authorize the Executive Director to execute leases with tenants using that template, allowing for reasonable modifica-

tions that do not materially harm the Authority's finances, along with any necessary clerical revisions by legal counsel.

e. Third Amendment to Lease Agreement – HERC Rentals, Inc.

At its meeting on April 6, 2026, the Finance and Administration Committee voted unanimously (3–0) to recommend that the Commission approve of a Third Amendment to Lease Agreement with Herc Rentals, Inc., extending it by five years with an option for another five years. The extension requires Herc to build a block wall and is contingent on timely permit application and approval.

**f. Access Agreement
BUR Fuel Company, LLC**

At its meeting on April 6, 2026, the Finance and Administration Committee voted unanimously (3–0) to recommend that the Commission approve an Access Agreement with BUR Fuel Company, LLC ("BUR Fuel") for BUR Fuel's temporary access and use of the Authority's property for the purpose of performing geotechnical and surveying services in connection with the evaluation of the Fuel Farm Expansion Project.

g. Airport Model Compensation Agreement

Staff recommended that the Commission authorize the Executive Director to sign an agreement with three Glendale Community College architecture students to secure intellectual property rights to a donated 3D model of the Replacement Passenger Terminal, for a total payment of \$4,500 (\$1,500 per student).

Motion

Commissioner Wilson moved approval of the Consent Calendar; seconded by Commissioner Hampton.

Motion Approved

The motion was approved (7–0, 2 absent).

AYES: Hampton, Quintero, Najarian,
Ovrom, Lyon, Wilson, Gabel-Luddy
(via teleconference)

NOES: None

ABSENT: Lyon, Asatryan

6. ITEMS FOR COMMISSION APPROVAL

a. EMT Certification / Recertification, Continuing Education, and Quality Improvement / Assurance Care Professional Services Agreement – Superior Life Support, Incl.

Staff presented for Commission approval a Professional Services Agreement with Superior Life Support, Inc. to provide EMT certification and recertification, continuing education, and quality improvement/assurance services. The agreement will run for an initial three-year term, with two optional one-year extensions. The total contract amount will not exceed \$87,324 during the initial term, with specified annual funding limits, and additional capped amounts if the extension options are exercised.

Motion

Commissioner Wilson moved approval; seconded by Commissioner Hampton.

Motion Approved

The motion was approved (7–0, 2 absent).

AYES: Hampton, Quintero, Najarian, Ovrom, Lyon, Wilson, Gabel-Luddy (via teleconference)

NOES: None

ABSENT: Lyon, Asatryan

b. Professional Services Agreement Geosyntec Consultants, Inc.

Staff presented for Commission approval a Professional Services Agreement with Geosyntec Consultants, Inc. for \$607,831, plus a \$60,000 (approximately 10%) contingency for unforeseen needs, for a total not-to-exceed amount of \$667,831. The services will support ongoing PFAS investigation efforts required by a Los Angeles Regional Water Quality Control Board order, including preparation of technical reports on PFAS presence in shallow and deep soils and conducting stormwater sampling.

Motion

Commissioner Wilson moved approval, seconded by Commissioner Hampton.

Motion Approved

The motion was approved (7–0, 2 absent).

AYES: Hampton, Quintero, Najarian, Ovrom, Lyon, Wilson, Gabel-Luddy (via teleconference)

NOES: None

ABSENT: Lyon, Asatryan

**c. Replacement Passenger
Terminal Program Manager –
Jacobs Project Management
Company – Contract Amendment
and Task Order Authorization**

At its meeting on April 6, 2026, the Finance and Administration Committee voted unanimously (3-0) to recommend that the Commission authorize Task Order No. 6 with Jacobs Project Management Co. in the amount of \$7,859,872 for program management services related to the Replacement Passenger Terminal Project. The Committee also recommended approval of Amendment No. 1 to extend the contract expiration date to May 1, 2028, and increase the contract limit from \$42 million to \$47 million to accommodate the expected timeline for demolition of the legacy facility, additional services, and project closeout.

Motion

Commissioner Wilson moved approval, seconded by Commissioner Hampton.

Motion Approved

The motion was approved (6–0, 3 absent).

AYES: Hampton, Quintero, Najarian,
Ovrom, Lyon, Wilson,

NOES: None

ABSENT: Lyon, Asatryan, Gabel-Luddy

7. CLOSED SESSION

The meeting convened to Closed Session at 9:55 a.m.

a. PUBLIC EMPLOYEE PERFORMANCE EVALUATION
(California Government Code Section 54957(b))
Title: Executive Director

Meeting reconvened to Open Session

The meeting was reconvened to open session at 10:38 a.m. with five Commissioners present.

Closed Session Report

There was nothing to report from the Closed Session.

8. ITEMS PULLED FOR DISCUSSION - None

9. EXECUTIVE DIRECTOR COMMENTS

- Updated the Commission on status of the government shutdown
- A traffic advisory will take place from April 20 – June 6 on Hollywood Way due to ongoing construction of the Replacement Passenger Terminal.

10. COMMISSIONER COMMENTS

(Commissioners may make a brief announcement, report on their activities, and request an agenda item for a future meeting.) None

11. PUBLIC COMMENT - None

12. ADJOURNMENT

The meeting was adjourned at 10:45 a.m.

Adjournment: To May 18, 2026, for the next scheduled meeting of the Burbank-Glendale-Pasadena Airport Authority – 2627 Hollywood Way, SkyRoom.

Jess A. Talamantes, President	Frank Quintero, Secretary
Date	Date

**STAFF REPORT PRESENTED TO THE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY
MAY 4, 2026**

**AWARD OF CONCESSION AGREEMENT
AUTOMATED TELLER MACHINE
BAUMTECH, LLC**

Prepared by
Madeleine Zavala
Sr. Manager, Business & Properties

SUMMARY

At its meeting on April 20, 2026, the Finance and Administration Committee (“Committee”) voted (3–0) to recommend that the Commission approve a proposed Automated Teller Machine Concession Agreement (“Agreement”) with BaumTech, LLC (“BaumTech”) for the installation, operation and management of two Automated Teller Machines (“ATMs”) at the Replacement Passenger Terminal (“RPT”).

BACKGROUND

As part of the customer service experience, Staff identified the need for ATM services at the RPT as is currently available in the existing terminal. In July 2025, Staff began the development of a Request for Proposals (“RFP”) with the objective to obtain an ATM service provider to install, operate and maintain two ATM locations at the RPT.

A timeline of the RFP was established with the goal of awarding the contract in May 2026 in order to provide the selected operator time to procure, install, and ensure that both ATMs are operational prior to the opening of the RPT.

PROCUREMENT PROCESS

On January 8, 2026, utilizing the Authority’s e-procurement website, PlanetBids, Staff issued the RFP for ATM Concession. The procurement schedule is listed below.

Procurement Phase Schedule	Date
RFP Issued by Authority	January 8, 2026
Deadline for Submission of written questions or requests for clarification	January 22, 2026
Proposals Due	February 6, 2026
Notice of Intent to Award	March, 2026
Award Recommendation to Authority Finance Committee	April 20, 2026
Award Recommendation to Authority Commission	May 4, 2026
Service Commencement Date (60 days prior to Opening RPT)	August 13, 2026

RESPONSES TO THE RFP

The PlanetBids system indicated that the RFP was downloaded 17 times with two proposals received. Upon review by the Procurement Department, both proposals were deemed to be responsive to the RFP requirements.

EVALUATION PROCESS

The evaluation criteria with a total of 100 points available are as follows:

- Experience, Background and Past Performance (10 pts)
- Organization and Key Personnel Assigned to Oversee ATM Concession (10 pts)
- Proposed Management Plan and Approach (20 pts)
- Proposed Design, Implementation and Installation Plan (20 pts)
- Financial Offer and Sample Monthly Reporting Form (40 pts)

A three-person evaluation team reviewed the proposals based on the available points by each scoring category. The team consisted of staff from various departments across the Airport.

Each member of the evaluation team independently reviewed and scored the proposals. All results were submitted to the Procurement Department which compiled the results. The final scoring results are listed below.

RFP ADM26-03 ATM CONCESSION

Selection Criteria	SC-1	SC-2	SC-3	SC-4	SC-5	TOTAL
	Firm's Exp., Background & Past Performance	Organization and Key Personnel Assigned to Oversee ATM Concession	Proposed Management Plan and Approach	Proposed Design, Implementation, and Installation Plan	Financial Offer and Sample Monthly Reporting Form	
Weighting Factor:	1	1	1	1	1	
Maximum Points Possible	10	10	20	20	40	100
FIRM:						
BaumTech LLC	9	10	18	20	39	96
MobileMoney, Inc.	9	8	18	19	40	94

Firm	Proposed Transaction Fee	Points
BaumTech, LLC	\$ 2.77	39
Mobile Money	\$ 2.85	40

Based on the proposal review, Staff determined that BaumTech's proposal provides the best value for the Authority. BaumTech demonstrated its qualifications, knowledge, and staffing plan tailored to oversee and manage the ATMs at the RPT.

The firm has been in business for over 18 years and operates a network of more than 700 ATMs in 37 states and has amassed a large network of ATM technicians, vault cash suppliers and other service providers throughout the United States. It has ATMs at a number of airports including New Orleans International Airport, Reno-Taho International Airport, Phoenix Gateway Airport and San Diego Airport.

DETAILS

Key components of the proposed Agreement are:

- Locations: One ATM in the Baggage Claim (Pre-Security)
 One ATM in Holdroom 7 (Post-Security)
- Purpose: Installation, Management and Operation of two ATMs
- Term: Five years
- Options: Two, One-Year extension options
- Rent: \$2.77 per Transaction Fee
- Others: BaumTech is responsible for the operation, maintenance, and daily cash restocking of each ATM.

REVENUE IMPACT

Based on the current ATM usage in the existing terminal, the proposed Agreement is anticipated to generate non-aviation revenue of approximately \$20,000.00 per year.

RECOMMENDATION

At its meeting on April 20, 2026, the Committee voted (3–0) to recommend that the Commission approve the proposed Agreement with BaumTech for ATM services at the RPT and authorize the President to execute the same.

**STAFF REPORT PRESENTED TO THE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY
MAY 4, 2026**

**AWARD OF CONTRACT
ADK CONSULTING, INC.**

Presented by
Terence Boga, Esq., General Counsel

SUMMARY

This item seeks Commission approval of a professional services agreement ("Agreement"), copy attached, with ADK Consulting, Inc. ("ADK") for executive search and consulting services to for the Executive Director position when the incumbent leaves office in the first quarter of 2027.

BACKGROUND

The Authority contracts with TBI Airport Management, Inc. ("TBI") for airport management services. Executive Director John T. Hatanaka, a TBI employee, has announced that he is retiring in the first quarter of 2027 once the Replacement Passenger Terminal has been completed and operations in the new facility have proceeded for several months. Pursuant to the airport management services contract, unless the Commission chooses to employ or appoint an Authority Executive Director, TBI is required to designate an individual to serve as Executive Director after consultation with and approval by the Commission.

PROPOSED AGREEMENT

The proposed Agreement will engage ADK for executive search and consulting services to fill the vacancy in the Executive Director position when Mr. Hatanaka retires next year. Although the successor Executive Director will be a TBI employee, the proposed Agreement ensures that the Commission can be involved throughout the search process. ADK's services will be performed in phases as follows: candidate pool development; screening; and final interviews and negotiations. The fee will be \$47,574 exclusive of reimbursement for approved travel expenses, and will be paid in three \$15,858 installments. ADK will issue the first invoice upon contract execution, the second invoice after recruitment handout posting, and the last invoice at contract completion.

RECOMMENDATION

It is recommended that the Commission approve the proposed Agreement with ADK for executive search and consulting services in connection with upcoming vacancy in the Executive Director position.

Exhibits: ADK Proposal
 Professional Services Agreement

**STAFF REPORT PRESENTED TO THE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY
MAY 4, 2026**

**ON-CALL PAVEMENT IMPROVEMENT CONTRACT AWARD
AND TASK ORDER APPROVAL
ON-CALL ARCHITECTURAL AND ENGINEERING CONTRACT
TASK ORDER APPROVAL
SOUTHEAST QUADRANT RECONFIGURATION PROJECT**

Presented by
Vincent Nguyen
Senior Manager, Engineering and Project Delivery

SUMMARY

At its meeting on April 20, 2026, the Operations and Development Committee ("Committee") voted (2-0, 1 absent) to recommend that the Commission:

- i) Award an On-Call Pavement Improvement Agreement ("Agreement") to Griffith Company ("Griffith") in a not-to-exceed amount of \$2,500,000 for a one-year term with two one-year extension options at the discretion of the Authority;
- ii) Pre-authorize the Executive Director to issue Griffith a task order in a not-to-exceed amount of \$1,000,000 for time sensitive pavement work for the Southeast Quadrant ("SEQ") Reconfiguration Project upon receipt of the accepted final scope and quantities;
- iii) Authorize the Executive Director to issue HNTB Corporation ("HNTB"), the Authority's existing on-call architectural and engineering ("A/E") services consultant, a task order in a not-to-exceed amount of \$125,000 for project management and construction management support for the SEQ Reconfiguration Project; and
- iv) Authorize Staff to file a CEQA Notice of Exemption for the SEQ Reconfiguration Project.

BACKGROUND

The on-call public works pavement improvement program was previously presented to the Committee as an informational item on January 20, 2026. The proposed program will enable Staff to address, with greater responsiveness, certain pavement improvement projects that are beyond the routine and minor work that will continue to be handled internally by the Airport's Maintenance Department.

Currently, major and more complex public works projects are performed using an individual bid process, with all contracts over \$75,000 requiring approval by the Commission. This process can take several months to complete for each project. With an extensive network of

-1-

pavements, totaling over 13 million square feet on the airside and landside, the proposed on-call public works pavement improvement program would provide greater cost efficiency and flexibility for pavement project work. This program will not be utilized for Federal Aviation Administration ("FAA") grant funded projects as there is a specific required FAA procurement process that will continue to be utilized.

The on-call public works pavement improvement method has been utilized throughout other Southern California airports such as Long Beach Airport, John Wayne Airport, and San Diego International Airport. The proposed program does not preclude the Authority from advertising a Request for Bids ("RFB") if deemed beneficial for a particular pavement improvement project.

Work is proposed to be issued to on an as-needed basis via task orders based on agreed upon scope of work and quantities utilizing unit prices obtained through the bidding for the on-call public works pavement improvement program. Commission approval is required for task orders over \$75,000. Utilizing this approach would allow for a streamlined task order issuance, maintain cost control by using competitively bid unit prices, and ensure flexibility in addressing different field work and needs.

PROCUREMENT

On January 29, 2026, Staff publicly solicited responses to an on-call public works pavement improvement services RFB on the Authority's PlanetBids e-procurement website. The solicitation was posted on websites for the Chamber of Commerce and City Hall for the Cities of Burbank, Glendale, and Pasadena. Staff also reached out to the Los Angeles Latino Chamber of Commerce as well as the Armenian Society of Los Angeles. Links to the RFB were sent to Dodge Construction Network and posted on the Southwest American Association of Airport Executives website. The Association of General Contractors California Chapter also included the solicitation in an email blast to all its members. In addition to the above, Staff identified within Burbank, Glendale, and Pasadena more than 20 contractors that may be able to perform a portion of the work. Staff contacted these firms directly by phone to notify them of the RFB.

Staff hosted a mandatory pre-bid meeting on February 11, 2026. During the pre-bid meeting, Staff provided a networking opportunity for prospective prime contractors to meet prospective subcontractors. The meeting was attended by five firms.

SELECTION PROCESS

For this procurement, bidders were required to provide unit prices on a rate sheet with various line items. The selection criteria is based on the lowest total bid price submitted for two sample projects: Sample Project 1 (Airside) and Sample Project 2 (Landside). The details of these sample projects were sealed. Staff then ranked each bidder's total project costs based on their unit prices.

Bids were closed on March 23, 2026. Two firms, Griffith and Excel Paving Company, submitted bids in response to the RFB. Based on the two sample projects, the lowest bidder was determined to be Griffith.

Company	Sample Project 1	Sample Project 2	Total Bid Price
Griffith Company	\$514,426.83	\$1,233,115.00	\$1,747,541.83
Excel Paving Company	\$2,174,670.67	\$3,973,328.00	\$6,147,988.67

Based on the bids received, Staff recommends awarding a contract only to Griffith which provided the most reasonable unit prices.

INITIAL TASK ORDER

If approved, Staff will contact Griffith for the SEQ Reconfiguration Project work. Following an additional site visit, Griffith will be required to provide finalized quantities and scope line items within two weeks. Upon review and acceptance by Staff, a task order will then be issued to Griffith.

The SEQ Reconfiguration Project is time sensitive because work must coincide with the opening of the Replacement Passenger Terminal ("RPT"). The current vehicle parking lots in the SEQ serve as close-in parking to the terminal. With the opening of the RPT, this close-in parking will transition to be the Airport's remote parking lots. That transition will require providing spaces for shuttles to drop off and pick up passengers, as well as modifications to the roadways to ensure an effective traffic flow.

FUNDING

The FY 2026 Facility Improvement Program Budget included \$2,500,000 in appropriation to commence the SEQ Reconfiguration Project which is anticipated to be adequate to accommodate expenditure for the current fiscal year. The balance of the funding necessary to complete the project will be requested in the FY 2027 budget.

OPERATIONAL IMPACTS

Timing of the construction work will vary and will be scheduled to minimize impacts on the current terminal roadway system.

PROJECT MANAGEMENT SERVICES

Due to the Staff time needed for the RPT, Staff intends to utilize the existing on-call A/E consulting contract with HNTB to provide project management and construction management support for the SEQ Reconfiguration Project. It is recommended that HNTB be issued a task order in a not-to-exceed amount of \$125,000 for this service to ensure delivery of the SEQ Reconfiguration Project is on time, to manage any impacts related to the project, and to handle extensive coordination required with many stakeholders, including Planning, Engineering, Maintenance, Operations, Ground Transportation, ICT, Communications, SMS and Security.

ENVIRONMENTAL REVIEW

Staff have reviewed the CEQA guidelines regarding exemptions applicable to the SEQ Reconfiguration Project and determined that the project is exempt pursuant to the Class 1 categorical exemption (14 C.C.R. § 15301). Among other things, that exemption covers minor alteration of existing facilities involving no expansion of existing use.

RECOMMENDATION

At its meeting on April 20, 2026, the Operations and Development Committee (“Committee”) voted (2–0, 1 absent) to recommend that the Commission award the proposed Agreement to Griffith in a not-to-exceed amount of \$2,500,000, pre-authorize the Executive Director to issue a task order to Griffith in a not-to exceed amount of \$1,000,000 for the SEQ Reconfigur-ation Project, authorize a task order to HNTB for project support in a not-to-exceed amount of \$125,000, and approve the filing of a CEQA Notice of Exemption to for the project.

**STAFF REPORT PRESENTED TO THE
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY
MAY 4, 2026**

**PERIMETER INTRUSION DETECTION SYSTEM
EQUIPMENT REPLACEMENTS**

Presented by
Kimberley Parker-Polito
Director, Information Communication Technologies

SUMMARY

Subject to the recommendation of the Operations and Development Committee (“Committee”) at its meeting immediately preceding the Commission meeting, Staff seeks the Commission to approve the purchase and installation of replacement equipment for the Airport Perimeter Intrusion Detection System (“PIDS”) and its associated thermal cameras. The current equipment, originally installed in 2009, is no longer supported by the manufacturer and an upgrade is necessary to ensure compatibility and connectivity with the Replacement Passenger Terminal (“RPT”) system.

The proposed cost for the acquisition and installation of the equipment is \$125,637.99. Staff seeks an additional 10% project contingency in the amount of \$18,500 for unforeseen circumstances during installation for a total project cost of \$144,137.99.

BACKGROUND

The current PIDS and thermal cameras monitor the areas around the Airport using the Digital Video Surveillance System (“DVSS”) manufactured by Sightlogix. The current PIDS, originally installed in late 2009, is no longer supported by the manufacturer and will need to be replaced for continued monitoring and intrusion detection as well as connection to the new intrusion detection system being installed in the RPT.

SOLE SOURCE JUSTIFICATION

The Authority’s DVSS contractor, Superior Alarm Systems (“SAS”) has provided the attached bid in the amount of \$125,637.99. This is a sole-source request to ensure system connectivity between the current PIDS and the new intrusion detection system for the RPT. SAS is well-versed with the requirements between the current PIDS and new systems for the airport security detection system and has the expertise to install the replacement PIDS equipment and cameras. This will ensure the intrusion detection system replacement equipment will maintain the current coverage area and connect to the RPT’s intrusion detection system.

If the Commission approves the proposal, the necessary procurement documentation will be issued to SAS immediately to guarantee price of the electronic equipment, installation and completion of this project by June 30, 2026.

CONTINGENCY

In the event of unforeseen circumstances during installation, Staff is recommending an approximate 10% contingency of \$18,500 be included in the project cost.

FUNDING

Appropriations for this project are included in the adopted FY 2026 Budget.

RECOMMENDATION

Subject to the recommendation of the Committee at its meeting immediately preceding the Commission meeting, Staff seeks the Commission to approve an agreement with SAS for the purchase and installation of replacement PIDS and thermal camera equipment for \$125,637.99, authorize a project contingency in the amount of \$18,500 for a total project cost of \$144,137.99 and authorize the Executive Director to issue a purchase order for the same.

**AUTOMATED TELLER MACHINE
CONCESSION AGREEMENT
FOR
HOLLYWOOD BURBANK AIRPORT
BETWEEN
BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY
AND
BAUMTECH, LLC**

KEY CONCESSION AGREEMENT TERMS

(The table below is for convenience only. In case of conflict between the table below and the provisions of this Agreement, the provisions in this Agreement shall govern. Capitalized terms below have the meanings ascribed in Article 1.)

Agreement Date:		
Authority:	Burbank-Glendale-Pasadena Airport Authority <i>before RPT Opening Date</i> 2627 N. Hollywood Way Burbank, CA 91505 <i>after RPT Opening Date</i> 2827 N. Hollywood Way Burbank, CA 91505	
Concessionaire:	BaumTech, LLC 6565 St. Claude Ave. Arabi, LA 70032	
ATM Locations	As depicted in Exhibit A	Exhibit A
Expiration Date:	Initial Expiration Date shall be the fifth anniversary of RPT Opening Date; provided that upon the Executive Director's approval of Concessionaire's request, the term of Concession Period may be extended twice, each for a one-year period.	Section 2.3
Concession Period:	RPT Opening Date to 11:59 p.m. on the Expiration Date or any earlier termination date	Section 2.4
Base Fee During Concession Period:	\$2.77 per ATM Transaction (subject to adjustments as described in the Agreement)	Section 5.2
Base Fee Due Date:	In arrears, on the fifteenth of each month.	Section 5.2
Due date for monthly Base Fee report:	The fifteenth of each month, for the prior calendar month	Section 5.2; Section 5.4
Payment Method:	Automated Clearing House (ACH) or Electronic Fund Transfer (EFT) or other method designated by the Authority	Section 5.5
Performance Guarantee:	\$5,000	Section 6.2
Initial Installation Deadline:	60 days before the RPT Opening Date.	Article 1, Section 10.3

Activation Delay Damages:	If Concessionaire fails to have the two ATMs fully installed and operational by RPT Opening Date, \$200 per day	Section 10.6
Exhibits:	A – ATM LOCATIONS AND ANCILLARY LOCATIONS B – AUTHORITY RFP NO. ADM26-03 C – CONCESSIONAIRE PROPOSAL D – FEDERAL REQUIREMENTS	

TABLE OF CONTENTS

PAGE NO.

ARTICLE 1	DEFINITIONS.....	1
ARTICLE 2	EFFECTIVE DATE.....	4
2.1	Effective Date	4
2.2	Pre-Concession Period	4
2.3	Expiration Date	4
2.4	Concession Period.....	5
ARTICLE 3	RIGHTS GRANTED	5
3.1	Pre-Concession Period Rights.....	5
3.2	Concession Period Rights	5
3.3	No Real Property Interest.....	5
3.4	Nonexclusive Rights	5
3.5	No Warranty by Authority	5
ARTICLE 4	ATM LOCATIONS	6
4.1	ATM Locations and Ancillary Locations	6
4.2	Acceptance of “As is” Conditions	6
4.3	Authority Access.....	7
ARTICLE 5	CONCESSION FEE	7
5.1	Obligation to Pay Concession Fee	7
5.2	Base Fee	7
5.3	Additional Fees	8
5.4	Form of Payment.....	8
5.5	Place of Payment, Report, and Statement Submittal	9
ARTICLE 6	PERFORMANCE GUARANTEE.....	9
6.1	Purpose.....	9
6.2	Amount	9
6.3	Use	10
6.4	Replenishment.....	10
6.5	Release	10
ARTICLE 7	ADDITIONAL REQUIREMENTS RELATING TO REPORTS.....	10
7.1	Method of Report Submission	10
7.2	Late Reports/Documentation	11
ARTICLE 8	RECORDKEEPING AND AUDITS.....	11
8.1	Maintenance of Records	11
8.2	Concessionaire Internal Control System Requirements	11
8.3	Production of Records.....	12
8.4	Under and Over Reporting of Amounts Due	12
ARTICLE 9	PERMITTED USE.....	13
9.1	General.....	13
9.2	Permitted Use.....	13
9.3	Limitations	14
9.4	Cooperation.....	15
ARTICLE 10	INITIAL INSTALLATIONS.....	15
10.1	General.....	15
10.2	Design	15

TABLE OF CONTENTS (cont'd)

	PAGE NO.
10.3 Initial Installations	16
10.4 Testing and Inspections.....	16
10.5 Coordination for Access	16
10.6 Operational by RPT Opening Date	16
ARTICLE 11 OPERATIONS AND MAINTENANCE.....	17
11.1 Compliance with Law, Government Permits, and Approvals	17
11.2 Principal Use of Airport.....	17
11.3 Standard of Service	17
11.4 Staffing.....	17
11.5 Badging and Security Requirements.....	18
11.6 ATM Specifications	18
11.7 Surcharge notifications	18
11.8 Branding.....	19
11.9 Technology and Performance Reviews	19
11.10 ATM Security Program.....	19
11.11 Continuous Operation	19
11.12 Maintenance, Repair, and Restoration	20
11.13 Utilities.....	22
11.14 Emergency De-Activation	22
11.15 Smoking Restrictions	23
11.16 Authority's Responsibility	23
11.17 Correction for Maintenance Failings	23
ARTICLE 12 DEFAULT EVENTS	23
12.1 Default Events.....	23
12.2 Remedies.....	24
12.3 Waiver by Concessionaire	25
12.4 Cumulative Remedies	26
12.5 Performance of Concessionaire's Covenants by Authority	26
12.6 Excuse of Performance by Authority.....	26
12.7 Default by the Authority	26
ARTICLE 13 DAMAGE AND DESTRUCTION.....	27
13.1 Destruction Covered by Insurance.....	27
13.2 Destruction Not Covered by Insurance.....	27
13.3 Authority's Election to Terminate	28
13.4 Concessionaire's Election to Terminate	28
13.5 Procedure for Repair or Restoration	29
13.6 Other Requirements	29
13.7 Damage to Airport Facilities.....	29
13.8 Waiver by Concessionaire	29
ARTICLE 14 CONDEMNATION.....	29
14.1 Condemnation.....	29
14.2 Notice to Other Party	29
14.3 Termination on Condemnation	30
14.4 Award.....	30

TABLE OF CONTENTS (cont'd)

PAGE NO.

ARTICLE 15	ADDITION OR REMOVAL OR RELOCATION OF ATM LOCATIONS OR ANCILLARY LOCATIONS.....	30
15.1	Addition of ATM Locations	30
15.2	Removal or Relocation of Ancillary Installations	31
15.3	Authority Election to Relocate ATM Locations or Terminate Agreement.....	31
15.4	Concessionaire Election to Terminate	31
ARTICLE 16	REMOVAL OF PROPERTY UPON LICENSE TERMINATION	32
16.1	Removal of Property Upon Termination	32
16.2	Holdover After End of Concession Period	32
16.3	Holdover After Termination of License at a Specific Airport Location.....	33
16.4	Ownership of Concession Improvements, Removable Fixtures	34
ARTICLE 17	ALTERATIONS	35
17.1	Construction.....	35
17.2	Authority's Assumption of Concessionaire Improvements	36
17.3	No Liability of Authority	36
17.4	Payment.....	37
ARTICLE 18	INSURANCE.....	37
18.1	General.....	37
18.2	Commercial General Liability	37
18.3	Commercial Automobile Liability.....	37
18.4	Workers' Compensation and Employer's Liability	38
18.5	Property Insurance	38
18.6	Commercial Crime Insurance	38
18.7	Concessionaire's Risk.....	38
18.8	Additional Requirements	38
18.9	Proof of Insurance.....	39
18.10	Insurance Requirements for Concessionaire Agents	40
ARTICLE 19	INDEMNIFICATION.....	40
19.1	Concessionaire Indemnification of Authority.....	40
19.2	Subcontractor Indemnification of Authority.....	41
19.3	Disclaimer of Liability	41
ARTICLE 20	ENVIRONMENTAL PROTECTION	41
20.1	Definitions.....	41
20.2	Concessionaire Representations, Warranties, and Covenants	42
20.3	Environmental Sustainability Programs	43
20.4	Concessionaire Environmental Reporting and Response Requirements	43
20.5	Environmental Indemnification and Reimbursement	44
20.6	Limitations	45
ARTICLE 21	GENERAL PROHIBITION AGAINST ASSIGNMENT OR SUBLICENSE ..	45
21.1	No Assignment or Sublicensing Without Consent	45
21.2	Limited Effect of Consent.....	45
ARTICLE 22	TAXES, ASSESSMENTS, AND CHARGES.....	45
22.1	Taxes, Assessments and Other Charges.....	45
22.2	Contest of Tax or Charge.....	46

TABLE OF CONTENTS (cont'd)

	PAGE NO.
22.3 Payment by Authority	46
ARTICLE 23 DISCLAIMER OF LIENS.....	47
23.1 Creation of Lien Prohibited	47
23.2 Authority Right to Clear	47
23.3 No Consent by Authority	47
23.4 Survival	47
ARTICLE 24 SUBORDINATION.....	47
24.1 Subordination.....	47
24.2 Transfer in Event of Foreclosure	48
24.3 Subordination to U.S. Government Agreements	48
ARTICLE 25 CONCESSIONAIRE REPRESENTATIONS AND WARRANTIES	48
25.1 Representations and Warranties.....	48
25.2 Additional Covenants.....	49
ARTICLE 26 GENERAL PROVISIONS	49
26.1 Notices	49
26.2 Airport Rules and Regulations.....	50
26.3 Security	50
26.4 Generally Accepted Accounting Principles	50
26.5 No Waiver of Responsibility	51
26.6 Force Majeure	51
26.7 Time is of the Essence	51
26.8 Authority Executive Director.....	51
26.9 Relationship of Parties	51
26.10 Joint and Several Liability	52
26.11 Effect of Debarment of Concessionaire	52
26.12 Labor Disputes	52
26.13 Litigation.....	52
26.14 Rules of Construction	52
26.15 Exhibits	53
26.16 Incorporation of Mandatory Language	53
26.17 Integration	53
ARTICLE 27 SIGNATURES.....	53
27.1 Electronic Signature and Delivery	53
27.2 Counterparts	54
27.3 Parent Company	54
EXHIBIT A ATM LOCATIONS AND ANCILLARY LOCATIONS	
EXHIBIT B RFP NO. ADM26-03	
EXHIBIT C CONCESSIONAIRE PROPOSAL	
EXHIBIT D FEDERAL REQUIREMENTS	

AUTOMATED TELLER MACHINE CONCESSION AGREEMENT

THIS AUTOMATED TELLER MACHINE CONCESSION AGREEMENT (“Agreement”) is dated _____, 2026 for reference purposes and is executed by the Burbank-Glendale-Pasadena Airport Authority (“Authority”), a California joint powers agency, and BaumTech, LLC a Louisiana Limited Liability Company.

RECITALS

A. The Authority is the owner and operator of Hollywood Burbank Airport (officially known as Bob Hope Airport) (“Airport”), a public land airport primarily located in Burbank, California.

B. The Authority is constructing a replacement passenger terminal (“RPT”) with an anticipated opening date of October 13, 2026.

C. Concessionaire is in the business of managing and operating automated teller machines (“ATMs”) and desires to install and operate ATMs at the Airport.

E. The Authority desires to grant Concessionaire the right to install, manage and operate ATMs at designated RPT locations.

F. The Authority Commission has determined the necessity for this Agreement to further the policies and objectives stated in Public Utilities Code Section 21690.5 et seq., and has considered the factors specified in Section 21690.9.

NOW THEREFORE, the parties agree as follows:

ARTICLE 1 DEFINITIONS

As used in this Agreement, unless a different meaning is clearly required, the following terms shall have the meanings set forth below. These definitions shall apply regardless of whether the term is capitalized.

Activation Delay Damages	As defined in Section 10.6(b).
Additional ATM Location	As defined in Section 15.1.
Additional Fees	Any amount owed to the Authority pursuant to this Agreement, other than Base Fee.
Airport	Hollywood Burbank Airport (officially known as Bob Hope Airport).
Airport Manager	Person engaged by the Authority to function as the manager of the Airport. As of the execution of this Agreement, the Airport Manager is TBI Airport Management, Inc., a Delaware corporation.

Airport Representative	An officer, employee, contractor, or consultant of the Authority or the Airport Manager acting in a professional capacity.
Airport Rules and Regulations	July 1, 2023 Airport Rules and Regulations (including any revisions), or successor, adopted by the Authority Commission.
Airport Terminal	The Replacement Passenger Terminal (under construction as of the execution of this Agreement) in the northeast quadrant of the Airport.
Alterations	As defined in Section 17.1.
Ancillary Installation	Any equipment, hardware, structure, wiring or other installation placed by Concessionaire at an Ancillary Location to support the operation of the ATM Concession.
Ancillary Location	A location at the Airport where Concessionaire has a revocable license to install an Ancillary Installation as specified in Exhibit A.
ATM	A machine, commonly known as an “automated teller machine,” with a user interface, that enables customers to perform financial transactions, such as account balance inquiries and cash withdrawals.
ATM Concession	Collectively, all parts and elements (including software and hardware) of Concessionaire’s enterprise to manage, operate and maintain ATMs at the Airport pursuant to this Agreement.
ATM Installation	Any equipment, hardware, structure, wiring or other installation placed by Concessionaire at an ATM Location to enable ATM operation.
ATM Location	A location at the Airport where Concessionaire has a revocable license to install an ATM as specified in Exhibit A.
ATM Transaction	Each completed transaction using Concessionaire’s ATMs at the Airport (such as cash withdrawals, fund transfers).
Authority	Burbank-Glendale-Pasadena Airport Authority.
Authority Commission	Burbank-Glendale-Pasadena Airport Authority Commission.
Authority Indemnitees	The Authority, the Airport Manager, the Cities of Burbank, Glendale, and Pasadena, and their respective officers, officials, directors, employees, agents, representatives, and volunteers.
Base Fee	As defined in Section 5.2.
Concession Fee	Collectively, Base Fee and Additional Fees.
Concession Period	From the RPT Opening Date to 11:59 p.m. on the Expiration Date or any earlier termination date.

Concessionaire	BaumTech, LLC
Concessionaire Agent	An employee, consultant, Subcontractor, licensee, vendor, affiliate, invitee, serviceperson, designer, architect, contractor, or other person who is performing services on behalf of or for the benefit of Concessionaire, regardless of location.
Concession Improvements	As defined in Section 17.1.
Default Event	As defined in Section 12.1.
Executive Director	Burbank-Glendale-Pasadena Airport Authority Executive Director (or, in the absence of the Executive Director, such other Authority officer designated by the Authority Commission) or such person's designee.
Expiration Date	Date that this Agreement expires (unless earlier terminated), which shall be the fifth anniversary of RPT Opening Date; subject to extensions pursuant to Section 2.3.
FAA	Federal Aviation Administration.
Federal Requirements	The federal requirements set forth in Exhibit D, which requirements are applicable to contracts not funded by an Airport Improvement Program grant from the FAA.
Fiscal Year	July 1 through June 30.
Initial Installation Deadline	60 days before the RPT Opening Date.
Initial Installations	As specified in Section 10.3(a).
Installation Plan	Concessionaire's plan to make installations at the ATM Locations and the Ancillary Locations, as approved by the Authority.
Monthly Concession Fee Report	The monthly report due pursuant to Section 5.2(b).
Notice for Additional Location	As defined in Section 15.1.
Notice to Proceed	The written notice to Concessionaire by which the Authority allows Concessionaire to commence work on an ATM Installation or an Ancillary Installation.
Performance Guarantee	As defined in Article 6.
Pre-Concession Period	As defined in Section 2.2.
Proposal	Concessionaire's February 5, 2026 proposal in response to the RFP, set forth in Exhibit C.

Removable Fixtures	Trade fixtures or equipment installed by Concessionaire at an ATM Location or an Ancillary Location, but excluding those that have become such a part of the Airport property that they cannot be removed without causing substantial damage to the property.
RFP (Request for Proposal)	Authority RFP No. ADM26-03.
RPT Design-Builder	Holder, Pankow, TEC - A Joint Venture, or a successor design-builder for the construction of the Airport Terminal as designated by the Authority.
RPT Opening Date	The first date on which the Airport Terminal is opened to the travelling public and serves commercial flights. As of the execution of this Agreement, the RPT Opening Date is anticipated to be October 13, 2026.
RPT Pre-open Test Period	The 60-day period before the RPT Opening Date.
Subcontract	Contract between Concessionaire and a Subcontractor for the subcontractor's undertaking of a portion of Concessionaire's tasks relating to the ATM Concession.
Subcontractor	The counterparty to Concessionaire under a Subcontract.
Surcharge	Fee that Concessionaire charges ATM users for each ATM Transaction.
Sustainability Program	The Authority's program pertaining to environmental sustainability for operations at the Airport.
TSA	Transportation Security Administration.
Turnover Date	With respect to each ATM Location or Ancillary Location, the effective date of the Notice to Proceed allowing Concessionaire to commence construction and installation of the related ATM Installation or Ancillary Installation.

ARTICLE 2

EFFECTIVE DATE; PRE-CONCESSION AND CONCESSION PERIODS

2.1 Effective Date. This Agreement shall be effective and binding on the parties upon execution.

2.2 Pre-Concession Period. The Pre-Concession Period shall begin upon execution of this Agreement and shall expire on the RPT Opening Date.

2.3 Expiration Date; Extensions. The initial Expiration Date shall be the fifth anniversary of the RPT Opening Date. Upon the Executive Director's approval of Concessionaire's request (such request to be at least 90 days before the then-scheduled Expiration Date), the Concessionaire may be extended twice, each for a one-year period.

2.4 Concession Period. The Concession Period shall begin on the RPT Opening Date and shall expire at 11:59 p.m. on the Expiration Date or any earlier termination date.

ARTICLE 3 RIGHTS GRANTED

3.1 Pre-Concession Period Rights. During the Pre-Concession Period, the Authority grants to Concessionaire the right to make installations at the ATM Locations and the Ancillary Locations to enable operation of ATMs during the Concession Period.

3.2 Concession Period Rights. During the Concession Period, subject to this Agreement:

(a) Concessionaire shall have the right to manage and operate ATMs at the ATM Locations.

(b) Concessionaire is granted a revocable license to use: (i) the ATM Locations for ATMs and the related ATM Installations, and (ii) the Ancillary Locations for the Ancillary Installations.

(c) Concessionaire shall have the rights of ingress to and egress from the ATM Locations and the Ancillary Locations via the public areas of the Airport, Airport roadways, and common-use roadways, exercised in a reasonable manner. Concessionaire shall obtain the Authority's prior approval before accessing other areas of the Airport for any purpose.

3.3 No Real Property Interest. None of the rights granted shall be construed as a conveyance of real property interest. This Agreement is not a lease. In no instance shall Concessionaire be deemed to have acquired possessory rights of any real property at or about the Airport. No easement shall be created pursuant to the privileges granted under this Agreement.

3.4 Nonexclusive Rights. Nothing in this Agreement shall be construed to grant or authorize the granting of any exclusive right or privilege of any activity at the Airport. The Authority reserves the right to enter into other agreements, including concession agreements, with third parties for all or a portion of the services or concessions set forth in this Agreement.

3.5 No Warranty by Authority.

(a) Concessionaire has conducted its own research and analysis to determine the feasibility of the ATM Concession at the Airport. The Authority is under no obligation to protect or defend Concessionaire from loss of any investments. Concessionaire assumes all risks regarding its installation and all other aspects of its business and operations in connection with this Agreement. Concessionaire has not relied on any information provided by the Authority regarding the Authority's business, revenue or operations or the suitability of any ATM Location or Ancillary Location. The Authority makes no warranty, promise, or representation regarding the economic viability or any other aspects of Concessionaire's operations at the Airport.

(b) The Authority makes no representation or warranty regarding either: (i) the fitness of the ATM Locations for the ATM Installations, or (ii) the fitness of the Ancillary

Locations for the Ancillary Installations. Concessionaire shall be responsible for determining the fitness and conditions of the ATM Locations and the Ancillary Locations for their respective uses. Concessionaire shall not be entitled to any adjustment or other payments on account of the condition of the ATM Locations or the Ancillary Locations, any improvements, any failure of any improvements to be in working order, any necessity of Concessionaire to repair or take corrective actions concerning the ATM Locations or the Ancillary Locations, or because of the inability or delay of obtaining any required approvals from any public agency.

(c) The Authority makes no warranty that pattern of use of the Airport Terminal by air carriers or passengers will not change at any time. The Authority may refurbish or reconfigure the Airport Terminal or other Airport facilities, relocate air carriers, and construct new terminals and concourses to meet Airport needs. Concessionaire's obligations to pay the Concession Fee are absolute obligations and are not conditioned upon the number of air carriers or passengers using the Airport during any period of time.

(d) The Authority does not warrant any specific completion date for the Airport Terminal. Concessionaire is solely responsible for any costs or damages of whatever kind, direct or indirect, resulting from any delay in the RPT Opening Date. The Authority shall not reduce the Concession Fee or make other financial accommodations to Concessionaire based on any delays in the RPT Opening Date.

ARTICLE 4

ATM LOCATIONS; ANCILLARY LOCATIONS

4.1 ATM Locations and Ancillary Locations.

(a) The ATM Locations and the Ancillary Locations shall consist of the Airport locations described and delineated in Exhibit A.

(b) The parties acknowledge that, as of the execution of this Agreement, Exhibit A identifies the conceptual locations of the ATM Locations and the Ancillary Locations, which are subject to change by mutual agreement during the development of the Installation Plan. To the extent appropriate, Exhibit A shall be updated in accordance with the completed and approved Installation Plan before the Turnover Date.

(c) Throughout the term of this Agreement, the location and size of each ATM Location and each Ancillary Location may change from time to time. Upon approval of the Executive Director, Exhibit A shall be revised and updated to reflect such changes.

4.2 Acceptance of "As is" Conditions.

(a) Concessionaire shall diligently proceed with the installations at each ATM Location or each Ancillary Location as of the related Turnover Date.

(b) Concessionaire accepts that all ATM Locations and Ancillary Locations are made available in their "as is, where is, and with all faults" conditions for the ATM Concession without any Authority warranty.

4.3 Authority Access. Without limiting any other rights of the Authority as the property owner, Airport Representatives may access the ATM Locations and the Ancillary Locations at any reasonable time without prior notice to Concessionaire (but with reasonable effort to limit any interference with Concessionaire's operation) for the following purposes:

- (a) To determine compliance with this Agreement.
- (b) To gain access to the mechanical, electrical, utility, and structural systems of the Airport for the installation, construction, maintenance and repair of such systems.
- (c) To perform maintenance and make repairs that Concessionaire is obligated, but fails, to make.
- (d) To perform inspections, testing, reporting, surveys, environmental inspections, remediations, studies, and assessments during hours of Airport operation.
- (e) To address public health or safety emergencies (as determined by the Authority).

ARTICLE 5 CONCESSION FEE

5.1 Obligation to Pay Concession Fee.

- (a) Concessionaire shall pay a Concession Fee to the Authority in the amount and at the times prescribed below. The Concession Fee consists of Base Fee and Additional Fees.
- (b) This Agreement will generally be administered financially on the basis of the Authority's Fiscal Year.

5.2 Base Fee.

(a) Base Fee Amount. The Base Fee shall equal \$2.77 for each ATM Transaction for which Concessionaire imposes a Surcharge, subject to adjustment pursuant to subsection (c) below.

(b) Monthly Remittance and Report. No later than the fifteenth day of each month during the Concession Period, Concessionaire shall remit the Base Fee for the preceding calendar month, together with the related Monthly Concession Fee Report. The report shall be in the format required by the Authority, and shall include the following information for the related month:

(i) The categories of ATM Transactions available to users on the ATMs and the related Surcharge for each category.

(ii) For each day of such month, the total cash amount dispensed, the total number of ATM Transactions of each category (and the sum of such total), and the total

Surcharge collected for ATM Transactions of each category (and the sum of such Surcharge collected).

(iii) The Base Fee due.

(c) Base Fee Adjustment Following Surcharge Increase. Per Section 11.7, Concessionaire shall obtain the Authority's consent before making Surcharge changes. At the Executive Director's discretion, the Base Fee may be increased by an amount up to 30% of the Surcharge increase. For illustration, if the Surcharge is increased from \$3 per ATM Transaction to \$5 per ATM Transaction (and thus the difference is \$2), the Base Fee may be increased by \$0.6 (i.e., \$2 x 30%).

5.3 Additional Fees. Additional Fees shall consist of the following:

(a) Employee Parking Fees. The Authority has no obligation to provide motor vehicle parking spaces to any Airport concessionaires including Concessionaire. Upon Concessionaire's request, the Authority has the discretion to make spaces available at locations in common with employees of other Airport concessionaires. To the extent that the Authority provides parking spaces, the Authority shall charge Concessionaire a monthly fee based on the then-current rate for such spaces. Employee parking fees shall be due upon receipt of invoice from the Authority.

(b) Services. If the Authority provides any services to Concessionaire (such as janitorial services), at Concessionaire's request (which the Authority is not obligated to provide), Concessionaire shall pay according to the Authority's invoice.

(c) Taxes and Charges Paid by Authority. Reimbursement for the Authority's payment for the paying, discharging, or adjustment of taxes and charges pursuant to Section 22.3 shall be due immediately upon written demand of the Authority.

(d) Other Amounts Owed under this Agreement. In addition to the foregoing, Additional Fees shall also include all other amounts owed to the Authority (except for the Base Fee) pursuant to this Agreement.

5.4 Form of Payment.

(a) All payments shall be paid in lawful money of the United States of America without presentment, abatement, setoff, or deduction. The Authority may accept payment without prejudice to its right to recover the balance of such amount due and to pursue any other available remedies.

(b) All payments or charges shall be made via Automated Clearing House (ACH) or Electronic Fund Transfer (EFT) or other method as designated in writing by the Authority. Each payment from Concessionaire shall be accompanied with a detailed remittance advice, or clear instructions, outlining what charges are being paid. All payments shall be clearly reconcilable to their corresponding invoices or Monthly Concession Fee Reports. The Authority shall provide Concessionaire with the information necessary to send and receive such electronic payments.

(c) Concessionaire shall be responsible for any charges imposed by an intermediary financial institution for the transmission of a payment to the Authority. If the financial institution automatically deducts a dollar amount from the transmission for such charges, Concessionaire shall take that into consideration to ensure that the Authority's receipt equals the amount due. Any charges to the Authority or deduction from the payment by the financial institution (such that the Authority's receipt is less than the amount due) shall be invoiced to Concessionaire, and the invoiced amount shall be due upon receipt.

5.5 Place of Payment, Report, and Statement Submittal.

(a) Unless otherwise specified in this Agreement or directed by the Authority in writing, payment (or remittance advice, if payment made via ACH, EFT or similar method), reports, and statements required by this Agreement shall be delivered to the Authority's Accounting/Finance Department at the address set forth in Section 26.1, with an electronic copy to AR@bur.org.

(b) The designated place of submittal may be changed at any time by the Authority upon 10 days notice to Concessionaire. Payments shall be made payable to "Burbank-Glendale-Pasadena Airport Authority." Concessionaire assumes all risk, including assessment of late fees, if a payment made by mail or delivery service is lost or not delivered to the Authority on time.

(c) If the due date for a payment is not a business day, such payment may be made on the next succeeding business day, with the same force and effect as if done on the actual due date.

ARTICLE 6
PERFORMANCE GUARANTEE

6.1 Purpose. The Performance Guarantee shall secure Concessionaire's full and faithful performance of this Agreement. The Performance Guarantee shall not be considered to be held in trust by the Authority for the benefit of Concessionaire and it shall not be considered an advance payment of any component of Concession Fee (including late fees). The Authority shall not be required to maintain the Performance Guarantee in any separate account. Concessionaire shall not be entitled to any interest earnings on the Performance Guarantee while held by the Authority.

6.2 Amount; Delivery.

(a) The Performance Guarantee shall be \$5,000 subject to adjustment prescribed in subsection (b). Concessionaire shall deliver the Performance Guarantee (in the form of an electronic payment or a cashier's check to be cashed by the Authority), upon execution of this Agreement.

(b) Without limiting any other rights or remedies, if Concessionaire is late in paying any component of the Concession Fee more than three times during any Fiscal Year, the Authority may increase the required amount of the Performance Guarantee to an amount deemed necessary by the Authority.

6.3 Use. If any amount payable to the Authority is 10 days past due, or if any other default on Concessionaire's part under this Agreement has occurred and is continuing (and Concessionaire has not promptly implemented an effective cure within 10 days of the Authority's notice of such past-due payment or other default), the Authority may apply all or any part of the Performance Guarantee to cure any default by Concessionaire including: (i) the payment of the Concession Fee and other fees and charges; (ii) repair of damages to the ATM Locations, the Ancillary Locations or any other Airport facilities caused by a Concessionaire Agent; (iii) cleaning the ATM Locations and the Ancillary Locations upon expiration or termination of this Agreement; and (iv) reimbursing the Authority for costs associated with Concessionaire's failure to perform any of its obligations under this Agreement. Further, the Authority may draw on the Performance Guarantee immediately, without notice to Concessionaire, upon commencement of a bankruptcy case or other insolvency proceeding by or against Concessionaire or upon receipt of a notice of non-renewal.

6.4 Replenishment. After any draw on the Performance Guarantee, Concessionaire shall, immediately upon the Authority's written demand, transmit the dollar amount necessary to restore the Performance Guarantee to the then-required amount.

6.5 Release. The Performance Guarantee or the remaining portion thereof shall be released to Concessionaire within 90 days after expiration or termination of this Agreement. Notwithstanding the preceding, if any question exists concerning Concessionaire's compliance with this Agreement, or if there is any remaining obligation under this Agreement after expiration or termination, the Authority may require that the Performance Guarantee remain in place until the Authority is satisfied that there has been no violation of this Agreement and all obligations due under this Agreement have been performed.

ARTICLE 7

ADDITIONAL REQUIREMENTS RELATING TO REPORTS

7.1 Method of Report Submission; Additional Reports.

(a) All reports shall be submitted to the Authority using the technology and procedures designated by the Authority. The Authority shall not be obligated to furnish Concessionaire the equipment or systems necessary for such submittal. However, the Authority shall afford a reasonable time for Concessionaire to obtain the necessary technology or equipment and develop the necessary expertise to use the same. In the interim, Concessionaire may use an alternative Authority-approved method for such submittal.

(b) Upon 60 days notice, the Authority may change the form and frequency of submission of the reports and statements, and may require the submission of additional or different information about the ATM Transactions and Surcharge. Concessionaire may withhold information about individual customers to the extent that disclosure is prohibited by law but Concessionaire shall inform the Authority about the withholding of such information and a reasonable explanation for the legal basis.

7.2 Late Reports/Documentation. In the event Concessionaire is delinquent for 10 business days or more in furnishing any report or other documentation, the Authority may provide written notice of such delinquency.

ARTICLE 8 RECORDKEEPING AND AUDITS

8.1 Maintenance of Records; Authority's Right to Inspect and Audit.

(a) Concessionaire shall maintain clear and accurate records that will enable the Authority to audit Concessionaire's performance of this Agreement. Concessionaire's record handling policies and procedures shall be subject to review and approval by the Authority upon request.

(b) The Authority may require Concessionaire to furnish copies of periodic tax returns covering the operations of the ATM Concession. All copies of such returns shall be certified by an officer of Concessionaire to be exact copies of the original documents. Concessionaire shall promptly notify the Authority of and furnish copies of any financial or tax audit reports covering concession operations as conducted by the California Franchise Tax Board, the United States Internal Revenue Service, or any other government entity.

(c) The Authority has the right to conduct multiple types of audits throughout the Concession Period as well as upon expiration or termination of this Agreement. This right includes examination of Concessionaire's books and records relevant to the determination of any matters concerning the performance of Concessionaire.

8.2 Concessionaire Internal Control System Requirements.

(a) Concessionaire shall maintain an internal control structure designed to provide reasonable assurance that Concessionaire's assets are safeguarded from loss or unauthorized use, transactions are executed according to management's authority, and that financial records are reliable for ATM Concession revenues or any other matter relevant to this Agreement. Concessionaire shall adhere to reliable, consistent cash and recordkeeping systems and procedures in accordance with reasonable written internal control policies and procedures adopted by Concessionaire. The adherence to internal control policies and procedures shall be facilitated by the hiring, training, and supervision of qualified personnel, by an appropriate segregation of duties and by an understanding of all relevant policies and procedures.

(b) Concessionaire shall maintain clear and accurate books and records of ATM Concession revenues, in accordance with generally accepted accounting principles, in a physical location (provided such records may be digitally maintained) readily accessible by the Authority for at least six years after the end of the Fiscal Year to which they pertain or, in the event of a claim by the Authority, until such claim for payments shall have been resolved.

(c) This Section shall survive expiration or termination of this Agreement.

8.3 Production of Records.

(a) Upon request of the Authority, any and all books, records, and accounts pertaining to Concessionaire's operations or performance of this Agreement, including transaction level data, shall be produced or otherwise made accessible to Airport Representatives within 10 business days, for inspection, audit, or copying.

(b) Concessionaire may make requested records available to the Authority at a physical location other than Burbank, California, provided Concessionaire pays the full amount of the Airport Representative's expenses, including travel, lodging, and meals, to travel to the records' location for any inspection, audit, or copying. If the Airport Representative(s) are required to spend more than five business days examining the books or records due to a lack of organization of the records or searches for missing data, then, starting on the sixth business day, Concessionaire shall pay a daily fee of \$1,200 per Airport Representative per day or partial day. If upon examination or audit, the Airport Representative determines that sufficient documentation has not been maintained, retained, or made available to verify any matter relevant to this Agreement, the Authority shall be entitled to collect as an Additional Fee an amount equal to 5% of the Base Fee for the period in question.

(c) The Authority may require Concessionaire to reconstruct, at Concessionaire's sole expense, all records for the determination of Base Fee or any other matter relevant to this Agreement for any period being audited. Failure to reasonably reconstruct all records shall constitute a material default.

8.4 Under and Over Reporting of Amounts Due.

(a) If an audit discloses an underpayment, Concessionaire shall promptly pay the Authority the following: (i) the difference between the amount paid and the amount owed to the Authority, plus (ii) a late fee equal to 1.5% per month (subject to the maximum rate permitted under law) from the date on which the underpayment was originally due. If Concessionaire has understated the number of ATM Transactions by 1% or more, the entire expense of such audit shall be borne by Concessionaire. If the Authority deems it necessary to utilize the services of legal counsel in connection with collecting the reimbursement for such audit, then Concessionaire shall reimburse the Authority for reasonable attorneys' fees and litigation expenses as part of the costs incurred.

(b) If an audit discloses an overpayment, Concessionaire shall be granted credit toward future amounts due after first deducting the cost of the audit. In the event the cost of the audit exceeds the refund due, Concessionaire shall not be responsible for the balance of the cost of the audit, but shall also not be entitled to any refund or credit. If the audit is completed after the conclusion of this Agreement, and money is owed to Concessionaire, once all other payments owed to the Authority are satisfied, the remainder of the over-payment shall be paid to Concessionaire.

ARTICLE 9 PERMITTED USE; LIMITATIONS

9.1 General. The purpose of this Agreement is for the installation, operation and management of Concessionaire's ATM Concession at the Airport. All rights granted under this Agreement are to serve such purpose, and shall not be read to grant Concessionaire any rights beyond that scope.

9.2 Permitted Use.

(a) Concessionaire shall have the right and duty to design, install, and maintain the ATM Installations and related Ancillary Installations for the ATM Concession, and manage and operate the ATM Concession in accordance with this Agreement.

(b) Concessionaire shall use the ATM Locations for ATM operations and the Ancillary Locations for installations that support the successful and efficient operation of the ATMs.

(c) Subject to the requirements set forth below, Concessionaire may retain qualified Subcontractors for any work under this Agreement. Armored transport companies and security service companies retained by Concessionaire to transport and handle cash to and from the ATM are Subcontractors for the purpose of this Agreement.

(i) Upon the Authority's request at any time, Concessionaire shall within three business days furnish the Authority an up-to-date list of Subcontractors then engaged by Concessionaire to work on any part of the ATM Concession, and shall provide such other information about the Subcontractors and the related Subcontract as the Authority may reasonably request.

(ii) Each Subcontract shall include indemnification language specified in Section 19.2.

(iii) At all times, the Subcontractor's performance under the Subcontract at or around the Airport (or in connection with the ATM Concession) shall be deemed to be under Concessionaire's supervision. Concessionaire shall remain responsible for Concessionaire's duties under this Agreement in all respects.

(iv) All acts or omissions of a Subcontractor at or concerning the Airport shall be deemed to be those of Concessionaire. The Authority shall have the right to enforce any violation by a Subcontractor as if the violation was committed by Concessionaire, and accordingly exercise remedies against Concessionaire pursuant to this Agreement. In that regard, the Authority shall have no obligation to recognize any purported assignment of rights or delegation of obligations by Concessionaire to a Subcontractor.

(v) The Subcontractor shall have no claim against the Authority, and the Authority shall have no liability to the Subcontractor, for any reason whatsoever for any loss, damage or harm arising from the Subcontract, or acts or omissions by the Authority pursuant to this Agreement.

(d) Subject to Section 11.15, visiting service personnel and product deliveries shall be permitted to park or unload in areas designated for temporary vendor parking or unloading, or at other locations as may from time-to-time be designated by the Authority.

9.3 Limitations. Concessionaire shall not:

(a) Use the ATM Locations or the Ancillary Locations for any purpose other than the ATM Concession.

(b) Allow any condition on or conduct at the ATM Locations, Ancillary Locations or anywhere else in the Airport that materially or adversely affects the development, improvement, operation, or maintenance of the Airport.

(c) Use or permit any Airport facilities to be used in any manner which might interfere with the landing and take-off of aircraft from the Airport or otherwise constitute a hazard. The Authority has the right to take any action it considers necessary to protect the airspace and approaches of the Airport against obstruction, including the right to prevent Concessionaire from erecting, or permitting to be erected or located, any light fixture, building, object, structure, or growth of natural object on the premises or adjacent to the Airport that would limit the usefulness of the Airport or constitute a hazard to aircraft or obstruction to air navigation or communication facilities.

(d) Install, maintain, operate, or offer to sell or install any equipment or display or sign (including any display case, exhibit, diorama, courtesy direct-line, or brochure), without the Authority's prior approval.

(e) Interfere with or disturb the effectiveness or accessibility of the drainage and sewage system, fire hydrants and hoses, heating-ventilation-air conditioning system, electrical or other power systems, or communication system within the Airport.

(f) Interfere with the Authority's staff, businesses, or patrons, including unfair competition with other Airport concessions.

(g) Use the ATM Locations, the Ancillary Locations or any other Airport facilities for any improper, immoral, or unlawful purpose.

(h) Obstruct the roadways or passageways adjacent to or within the Airport, or other Airport common use facilities or public areas (provided that the ATM Installations and the Ancillary Installations made pursuant to this Agreement are not obstructions).

(i) Conduct solicitation activities or distribute materials in or about the Airport in any manner without the Authority's prior approval.

(j) Do anything that may invalidate, conflict with, or increase the rate of any insurance policy covering the Authority or the Airport. The Authority may limit, modify, or require removal of any materials, parts or equipment that it reasonably determines are not incidental to Concessionaire's operations. Concessionaire shall have 48 hours from receipt of such notice to remove and properly dispose of any items identified.

(k) Transact or otherwise engage in activities in the Airport other than as permitted under this Agreement.

9.4 Cooperation.

(a) Concessionaire acknowledges that the Authority may pursue Airport development, improvements, and maintenance activities from time to time that may affect the ATM Locations, the Ancillary Locations and other areas of the Airport. Concessionaire shall work cooperatively and in good faith with the Authority and other concessionaires and contractors in development, improvement, and maintenance activities to minimize any disruptions. If requested by the Authority, Concessionaire shall cooperate with and assist the Authority in the development and implementation of any plans, designs, ingress/egress, or transition that may arise in connection with such Airport development, improvement, and maintenance activities. The Authority may temporarily or permanently change any method of ingress or egress on the Airport, so long as the means of ingress and egress are reasonably equivalent to current access available to Concessionaire.

(b) Should a dispute arise between Concessionaire and any other concessionaire or contractor at the Airport, Concessionaire shall in good faith seek to resolve the dispute and shall avoid any interruption of the parties' operations at the Airport. The Authority shall have no obligation to intercede in such dispute. However, at its sole discretion, the Authority may request the parties to cooperate with the Authority to resolve the dispute and, in such event, the Authority (acting through the Airport Representative) shall have the right to make the final decision on the dispute resolution.

ARTICLE 10 INITIAL INSTALLATIONS

10.1 General. Concessionaire shall design and install the ATM Installations and the Ancillary Installations pursuant to this Agreement. Concessionaire shall be solely responsible for determining, and complying with, all applicable governmental requirements for such design, construction, and installation.

10.2 Design; Installation Plan.

(a) Concessionaire shall submit complete designs for the ATM Installations and the Ancillary Installations to the Authority for review according to the schedule set forth in the RFP and the Proposal. The designs shall meet the requirements in the RFP and the Proposal, unless otherwise approved in writing by the Authority.

(b) Concessionaire shall have the right, at its own expense, to inspect and survey the Airport site in connection with the development of the Installation Plan; provided Concessionaire shall obtain the Authority's approval and coordinate with the RPT Design-Builder before conducting any such inspection or survey.

10.3 Initial Installations

(a) During the period between the Turnover Date and the Initial Installation Deadline, Concessionaire shall diligently complete the installations at each ATM Location and Ancillary Location (collectively, “Initial Installations”). Concessionaire shall not commence work at an ATM Location or an Ancillary Location until the Authority has issued a Notice to Proceed for the relevant location.

(b) The Initial Installations shall conform to the approved Installation Plan, and Concessionaire shall obtain the Authority’s prior approval for deviations.

(c) The Initial Installations shall also be subject to the applicable provisions of Article 17.

(d) Concessionaire, at its sole expense, shall promptly repair damage to any Airport facility caused by Concessionaire or any Concessionaire Agent through its acts or omissions to act during the construction and installation, and shall restore the damaged facilities to substantially the same or better condition as they were before the damage.

10.4 Testing and Inspections

(a) Concessionaire shall, at its sole expense, conduct surveys, tests, and inspections as Concessionaire considers reasonably necessary or desirable in connection with the Initial Installations, to ensure that the ATMs are operational by the Initial Installation Deadline. Concessionaire shall obtain the Authority’s approval and coordinate with the RPT Design-Builder prior to conducting any such survey, test, or inspection of any area of the Airport. Within 30 days of completion of the Initial Installations, Concessionaire shall submit to the Authority final “as-installed” schematics and specifications, in the form required by the Authority. Record drawings shall be dated by the engineer or architect of record.

(b) None of the foregoing is intended to impede, or shall be construed as impeding, the Authority’s right to conduct surveys and inspections at, or otherwise enter, the ATM Locations or the Ancillary Locations during the Pre-Concession Period for safety or other reasons the Authority deems necessary for the completion, and preparation for the opening, of the Airport Terminal.

10.5 Coordination for Access. Concessionaire shall coordinate with the RPT Design-Builder on a timely basis regarding access through Airport facilities to accomplish the construction, installation, and testing contemplated in this Article.

10.6 Operational by RPT Opening Date.

(a) All installations for the ATM Concession shall be fully installed and operational by the RPT Opening Date.

(b) Concessionaire shall be liable for liquidated damages (“Activation Delay Damages”), in the amount \$200 each day that Concessionaire fails to have all installations for the ATM Concession be fully operational by the RPT Opening Date, until the post-RPT Opening Date

performance requirements under this Agreement are satisfied. The parties acknowledge that the Activation Delay Damages represent a reasonable estimate of the Authority's damages in the event of such failure. The Authority's acceptance of the Activation Delay Damages shall not prevent the Authority from exercising any other right or remedy for default available under this Agreement, at law, or in equity.

(c) Notwithstanding the foregoing, no Activation Delay Damages shall be assessed, and Concessionaire shall not be deemed in default, if Concessionaire obtained the Authority's consent before the RPT Opening Date (and the Authority shall not unreasonably withhold such consent if the delay is outside of Concessionaire's control and not due to Concessionaire's error).

(d) Notwithstanding any delay in the completion of any ATM Concession installation, the Concession Period shall begin and Concessionaire shall start paying the Concession Fee.

ARTICLE 11 OPERATIONS AND MAINTENANCE

11.1 Compliance with Law, Government Permits, and Approvals. Concessionaire shall implement the Installation Plan, and operate and maintain the ATM Concession (and every Concessionaire Agent shall perform their responsibilities) in a manner that complies with applicable laws. In such connection, Concessionaire shall be solely responsible for determining the applicable laws. Concessionaire, at its sole expense, shall obtain and maintain all related permits and licenses.

11.2 Principal Use of Airport. All of Concessionaire's business and operations at the Airport shall at all times be compatible with and subordinate to the Authority's operation of the Airport as a public airport, as determined by the Authority in its sole discretion.

11.3 Standard of Service. Concessionaire shall operate the ATM Concession with up-to-date technology, serving all Airport users in a fair and non-discriminatory manner, and shall maintain the highest degree of service based on industry standards for similar venues and in a manner acceptable to the Authority. Concessionaire shall fulfill the requirements set forth in the RFP and Proposal, and other provisions of this Agreement, at Concessionaire's sole expense.

11.4 Staffing; Manager.

(a) Concessionaire shall at all times retain a qualified, competent and experienced manager who shall manage and supervise the ATM Concession, with authorization to make representations and take ordinary actions with respect to such operations (including control of assigned Concessionaire Agents) on Concessionaire's behalf. All approvals, consents, representations, and commitments of the manager shall be binding upon Concessionaire. Notices to the manager shall constitute notice to Concessionaire. The manager shall generally be available to be contacted by the Authority during regular business hours. A qualified, competent, and experienced subordinate shall be in charge and available at all times during the manager's absence. Subject to Section 9.2(c), Concessionaire may enter into a Subcontract to retain a third-party to serve as the manager described in this subsection. Concessionaire shall provide the Authority the

name and relevant contact information before any manager assumes the post, and shall furnish advance notification to the Authority regarding any changes.

(b) Concessionaire shall have available qualified and properly trained personnel in adequate numbers to operate the ATM Concession, including staff for regular and routine maintenance of the ATM Installations and the Ancillary Installations and for providing solutions to technical issues as they arise. In performing their tasks, Concessionaire Agents shall adequately and safely carry out services in a courteous, prompt, and efficient manner.

(c) Concessionaire shall, at its own expense, conduct a background check, as required, on each Concessionaire Agent assigned to operate at the Airport or otherwise work on ATM Concession facilities that are (or are expected to be) installed at the Airport to comply with requirements of the Authority, FAA, TSA and other applicable government agencies.

(d) The Authority shall have the right to object to the demeanor, conduct, and appearance of any Concessionaire Agent operating at the Airport or doing business with the Authority. Immediately upon notice of such objection by the Authority, Concessionaire shall take all steps necessary to remedy the cause of the objection.

(e) Concessionaire shall provide the Authority the names and contact information of Concessionaire Agents who are assigned to perform work on-site at the Airport.

11.5 Badging and Security Requirements. All Concessionaire Agents who work at the Airport shall apply for and be issued a security identification badge prior to beginning work at the Airport. Concessionaire shall be responsible for all Concessionaire Agents' compliance with security rules, regulations, and procedures including those issued by the TSA and the Authority. The rules, regulations, and procedures of the TSA and the Authority regarding security matters may be modified from time to time and Concessionaire shall comply with all modifications. Concessionaire shall pay all costs associated with obtaining the required security identification badges and security clearances for its personnel, including the costs of training, fingerprinting, and badging as established by the Authority.

11.6 ATM Specifications; Subsequent Modifications.

(a) Each ATM shall comply with the specifications and feature requirements of Exhibit C of the RFP.

(b) After initial installation, Concessionaire shall obtain the Authority's consent, which shall not be unreasonably withheld, before making any material modification to the ATMs (including the appearance of the machine, user interfaces, the available services, functions). Any modification that involves an Alteration shall be subject to Section 17.

11.7 Surcharge notifications; changes.

(a) Concessionaire shall inform ATM users of the Surcharge for each type of ATM Transaction, through visible and clear displays on the user interface. ATM users shall be given an opportunity to cancel the transaction upon being notified of the Surcharge. Concessionaire shall not charge any fee for a cancelled transaction.

(b) Concessionaire shall not modify the Surcharge without the Authority's consent. The Authority may condition the consent on a corresponding adjustment to the Base Fee under Section 5.2(c)

11.8 Branding; No Other Advertisement Without Consent. Each ATM shall be branded in Concessionaire's own name or, subject to the Authority's approval, the name of a reputable national or regional financial institution. Branding changes shall be subject to the Authority's approval. Concessionaire shall furnish such information as the Authority may reasonably request in connection with the approval review. Other than the approved branding, no advertisements shall be affixed to any ATM Installation or shown through the user interfaces without the Authority's consent.

11.9 Technology and Performance Reviews.

(a) Concessionaire shall make commercially reasonable investments to keep the ATM Concession services and its technology contemporary and competitive with current market trends.

(b) Concessionaire shall furnish the Authority with a biennial report, by November 1 of each applicable year (i.e., November 1 after the second anniversary and then the fourth anniversary of the RPT Opening Date) regarding the performance of the ATM Concession relative to prevailing market trends and standards. At the Authority's request, Concessionaire shall provide proposals to upgrade the ATM Concession components based on prevailing industry standards.

11.10 ATM Security Program.

(a) Concessionaire, at its own cost, shall develop and implement a security program to ensure the safe operation of the ATM Concession. The program shall: (i) comply with applicable laws; and (ii) be consistent with the Authority's overall security program for the Airport. The security program shall be subject the Authority's review and approval. Concessionaire shall submit its written security program to the Authority by the Initial Installation Deadline.

(b) Modifications to the security program shall be subject to the Authority's advance approval. Upon receipt of the Authority's instruction, Concessionaire shall amend the security program according to such instruction within 30 days or such shorter time period as the Authority may, in its sole discretion, require.

(c) Concessionaire acknowledges that the Authority is not obligated to furnish firefighting services and security services for any area of the Airport. The Airport's police and fire departments, in their judgement and sole discretion, determine their priorities and allocation of resources with regard to any operation. The Airport Terminal and other areas of the Airport are within the municipal service area of the City of Burbank.

11.11 Continuous Operation.

(a) Concessionaire shall continuously and uninterruptedly operate the ATM Concession. Each ATM shall be operational 24 hours per day, 365 (or 366, as applicable) days

per year, except for (i) reasonable interruptions caused by repairs and maintenance, and (ii) circumstances outside Concessionaire's control.

(b) If an ATM must be removed for service or repair, Concessionaire shall install a serviceable replacement for the duration of the removal. To the extent such installation involves any Alterations, Concessionaire shall comply with Section 17.

11.12 Maintenance, Repair, and Restoration.

(a) Concessionaire shall:

(i) Conduct all appropriate studies for each ATM Installation or Ancillary Installation before installation, and also conduct supplemental studies periodically thereafter, as appropriate, to ensure safe and proper functioning and compliance with law.

(ii) Maintain each ATM Installation and Ancillary Installation in good working order and a neat and sanitary condition (including sanitization of any user interface) according to Authority standards.

(iii) Provide the Authority a written copy of Concessionaire's service and maintenance schedule of each ATM Installation and Ancillary Installation, and the type of services to be performed, and Concessionaire shall promptly notify the Authority of deviation of such schedule.

(iv) Provide a toll-free telephone number (or other adequate means acceptable to the Authority) for the Authority to obtain live-human support, at any time of the day and on any day, regarding a malfunction or other technical issues pertaining to any ATM Concession software or hardware component.

(v) Use best efforts to resolve the problem as soon as practicable after becoming aware that there is an outage or malfunction of any ATM. In any event, upon receiving a report of an outage or malfunction, Concessionaire shall provide: (i) if appropriate, remote diagnostic and repair within 60 minutes, or (ii) on-site repair within 24 hours.

(vi) Promptly inform the Authority of any malfunction at an ATM Installation or an Ancillary Installation that either: (i) is anticipated to last longer than one day; or (ii) has remained unresolved one day after Concessionaire's attempt at repair.

(vii) Immediately inform the Authority upon becoming aware of any outage or malfunction at an ATM Installation or an Ancillary Installation that can be reasonably anticipated to create a hazard to Airport users or damage to Airport property.

(viii) Provide, in a timely manner, for the adequate sanitary handling and removal of all trash, garbage and other refuse caused as a result of Concessionaire's operations.

(ix) Obtain the Authority's approval before making any alteration to Airport property, whether as part of maintenance or repair work.

(x) Comply with the requirements set forth in Exhibit A of the RFP, to the extent not listed above.

(b) Concessionaire shall not:

(i) Permit mechanical equipment to have any unreasonable vibration or noise.

(ii) Commit or permit waste, debris or a nuisance at the ATM Locations, Ancillary Locations, or any other area of the Airport.

(iii) Permit any noxious or toxic fumes or odors, dust, or dirt at the ATM Locations, Ancillary Locations, or any other area of the Airport.

(iv) Place a load on any floor area of the Airport which exceeds the floor load per square foot that such floor was designed to carry.

(v) Install any public address or paging system at any Airport facilities.

(vi) Install any locks or security systems of any kind or type without the prior written consent of the Authority.

(vii) Perform or permit to be done anything that may disturb Airport tenants or other Airport users.

(viii) Perform or permit to be done anything that may interfere with the effectiveness or accessibility of fire doors, or elevators in or adjacent to any ATM Location or Ancillary Location, including lines, pipes, wires, conduits, and equipment connected or appurtenant thereto.

(ix) Perform or permit to be done anything that may interfere with the effectiveness or accessibility of fire doors, or elevators in or adjacent to any ATM Location or Ancillary Location, including lines, pipes, wires, conduits, and equipment connected or appurtenant thereto.

(x) Hinder police, firefighters, or other emergency personnel in the discharge of their duties.

(xi) Permit any ATM Concession system component to interfere with Airport radio systems (including the Airport's operations radio systems, FAA radio operations, police department radio, other local public safety radio systems, and any other concessionaire's existing operations radio system). Any harmful interference detected shall be a cause for immediate shutdown of the component that is causing the interference until such time as it is corrected by Concessionaire at no cost to Authority.

(c) Concessionaire shall be solely responsible for the cost of maintenance or repair for damage to Airport property caused by Concessionaire Agents (whether through negligent acts or omissions) or any Concessionaire installations at the Airport. In the event of such

damage, the Authority may elect to: (i) perform such repair or maintenance itself, at Concessionaire's expense (in which case, Section 11.17 shall apply); or (ii) may require Concessionaire to perform the same and restore the property to a quality at least equal to the original in materials and workmanship. If the repair or maintenance is not of an emergency nature, the Authority shall give Concessionaire five days advance written notice of its election in such matter.

11.13 Utilities.

(a) The Authority shall pay for the electricity supplied to the ATM Locations and Ancillary Locations, to the extent that the use of the related electrical outlets is included in the Installation Plan or otherwise approved by the Authority.

(b) The Authority shall not be responsible to provide any data connections (whether wired or wireless) to any ATM Location or Ancillary Location.

(c) If Concessionaire requires utilities (including telecommunication or other data connection or transmission facilities) beyond those then-currently provided or that are available to be extended to an ATM Location or an Ancillary Location, Concessionaire shall pay the full cost and expense associated with the required upgrade/extension/installation of such utilities, and shall comply with all provisions for maintaining such utilities.

(d) The Authority shall not be liable to Concessionaire for any interruption in or curtailment of any utility service (including electricity).

(e) The Authority reserves the right to upgrade, extend, install, maintain, and repair all utilities and services at or across any ATM Location or Ancillary Location, whether or not such services or utilities are for the benefit of Concessionaire. The Authority shall take reasonable care and diligence to protect existing improvements and utilities and shall avoid to the greatest extent possible any unreasonable interference or interruption to Concessionaire's operations.

11.14 Emergency De-Activation.

(a) In response to a safety emergency (as determined by the Authority), the Authority shall have the right to take such action as the Authority deems necessary or appropriate to deactivate any ATM or remove any ATM Installation or Ancillary Installation. The Authority may, but is not obligated to, notify Concessionaire before taking such actions, but shall inform Concessionaire of the actions taken as soon as the Authority determines to be practicable to do so. The Authority shall not incur any liability to Concessionaire for such actions.

(b) Before the start of the Concession Period, Concessionaire shall provide the Authority, in writing, the recommended emergency protocols for the safe and efficient deactivation of each ATM, and the removal of ATM Installation and Ancillary Installation components. Concessionaire shall promptly provide the Authority updates to any change to the recommended protocols. Concessionaire acknowledges that the Authority shall not be bound by such protocols, in determining the appropriate actions in an emergency. None of the foregoing shall relieve Concessionaire of the full responsibility for the care of maintenance of the ATM Installations and

the Ancillary Installations, and for providing timely solutions to any system malfunction under this Agreement.

11.15 Smoking Restrictions. Concessionaire Agents shall comply with the City of Burbank's ordinance regulating smoking in places patronized by the public and the Authority's policies regarding smoking at Airport facilities

11.16 Authority's Responsibility. The Authority, without cost to Concessionaire, shall keep and maintain in good condition and repair, reasonable wear and tear excepted, the following: (i) foundations, roof and other structural components of the Airport Terminal; and (ii) all common area sprinklers, plumbing, sewer, electrical, water, gas, heating, ventilating and air conditioning systems, facilities, and equipment but only to the extent such systems, facilities, or equipment are located within the Airport Terminal. For clarification, the Authority shall have no obligation to repair any damage to any of the foregoing to the extent caused by the willful or negligent act or omission, including overuse or abuse, of Concessionaire or Concessionaire Agents, which damage shall be repaired promptly by Concessionaire, at Concessionaire's sole expense.

11.17 Correction for Maintenance Failings.

(a) The Authority shall be the sole judge of the quality of Concessionaire's maintenance of the ATM Installations and Ancillary Installations at their respective locations. The Authority or its representative may at any time, without notice, conduct inspections to determine if maintenance performance is satisfactory to the Authority. If the Authority determines that maintenance is not satisfactory, the Authority shall notify Concessionaire and set a correction deadline. Concessionaire shall perform the required maintenance within seven days of the Authority's notice and, if Concessionaire does not perform within such period, the Authority shall have the right to perform the maintenance. However, where unsatisfactory maintenance threatens the safety, health, or welfare of the traveling public and/or the Airport's facilities, Concessionaire shall immediately perform the maintenance.

(b) In the case where the Authority has paid any sum by reason of failure of Concessionaire to perform any maintenance obligation, Concessionaire shall pay the Authority such sum plus a 15% administrative fee.

(c) Should the Authority elect to use its own staff to perform Concessionaire's maintenance obligations, any timesheet of any employee of the Authority showing hours of labor or work allocated to any such repair, replacement, and/or alteration, or any stock requisition of the Authority showing the issuance of materials shall be conclusive evidence that the amount of such charge was necessary and reasonable.

ARTICLE 12 DEFAULT EVENTS; REMEDIES

12.1 Default Events. Each of the following shall constitute a "Default Event":

(a) (i) The voluntary or involuntary appointment of a receiver, trustee or liquidator to take possession of all or substantially all of the assets of Concessionaire when such appointment is not dismissed, terminated, or vacated in 30 days; (ii) a general assignment by

Concessionaire for the benefit or protection of creditors; (iii) Concessionaire's admission of its inability to pay its debts as they become due; or (iv) any action taken against or suffered by Concessionaire under any statute relating to insolvency, bankruptcy, reorganization, arrangement, composition, liquidation, dissolution or other relief for debtors; unless, in the case of an involuntary petition filed against Concessionaire to have Concessionaire adjudged a bankrupt or for reorganization or arrangement, the petition is dismissed within 30 days.

(b) Any attachment, execution, distraint, judicial seizure, or other process of law pursuant to which Concessionaire's rights or interest in Concessionaire's properties related to the ATM Concession, or this Agreement may be taken, occupied or used by anyone other than Concessionaire, when such attachment, execution, distraint, judicial seizure, or other process of law shall not be released, dismissed or stayed within 30 days.

(c) An attempted or purported assignment, transfer, conveyance, mortgage, grant of security interest, hypothecation or other encumbrance of all or any part of Concessionaire's rights or interests under this Agreement; or rights with respect to the ATM Locations or the Ancillary Locations, except as expressly permitted by this Agreement.

(d) Concessionaire is found to have made a material misrepresentation in this Agreement or in the Proposal, including a misrepresentation concerning Concessionaire's financial stability or experience in operating a concession of the type authorized by this Agreement.

(e) Concessionaire's misuse of any Airport facilities in a manner that, in the Executive Director's opinion, materially has affected the Airport operation or safety.

(f) A government entity terminates, revokes, or suspends any certificate, license, or permit held by Concessionaire without which Concessionaire is not lawfully empowered to perform its obligations under this Agreement, and such certificate, license, or permit is not reinstated, or a new one received, within five business days.

(g) Failure by Concessionaire to pay, when due, any Concession Fee (including Base Fee and any other amounts under this Agreement), where such failure continues for 15 days after notice (any such notice provided in this Section shall be in lieu of, and not in addition to, any notice required under Code of Civil Procedure Section 1161).

(h) Failure to maintain the Performance Guarantee in the required amount.

(i) Failure to maintain insurance at the prescribed levels.

(j) Failure to cure a default, breach or non-performance of any other requirement under this Agreement not covered by the above, after 30-day written notice by the Authority; provided that in the event of a curable default (as determined by the Authority) and Concessionaire has commenced to diligently cure the default within such 30-days, then the Authority may extend such cure period for another 60 days.

12.2 Remedies. Upon the occurrence of any Default Event by Concessionaire, the Authority may:

(a) Revoke Concessionaire's license to use the ATM Locations and the Ancillary Locations, in which case this Agreement shall terminate upon the date specified in the Authority notice and Concessionaire shall peaceably remove its properties pursuant to Article 16. In such event, the Authority shall be entitled to recover from Concessionaire all of the following:

(1) The unpaid amounts (including late charges and interest) payable by Concessionaire under this Agreement that have accrued to the date of termination.

(2) The worth at the time of termination of the Base Fee (defined in Section 12.2(d) below) which would have accrued under this Agreement from the date of termination until the Expiration Date less the worth at the time of termination of the amount of such Concession Fee loss that Concessionaire proves could have been reasonably avoided.

(3) Any other amount necessary to compensate the Authority for all damages and losses proximately caused by Concessionaire's failure to perform this Agreement including the expenses of finding a successor concessionaire, costs of putting the ATM Locations and the Ancillary Locations in good order, condition and repair, including necessary renovation and alteration, reasonable attorneys' fees, court costs, all costs incurred in the appointment of and performance by a receiver to protect the Authority's interest under the Agreement and any other reasonable cost.

(b) Pursue any other remedy to continue this Agreement in effect and enforce all rights and remedies under this Agreement, including the right to recover amounts payable by Concessionaire as they become due, even though Concessionaire has breached this Agreement and abandoned the use of the ATM Locations and the Ancillary Locations. In the event Concessionaire does not use the ATM Locations and the Ancillary Locations as contemplated and commence payment of amounts due, the Authority shall have all of the rights and be entitled to recover from Concessionaire all of the damages described in this Section.

(c) If the Authority terminates this Agreement pursuant to Section 12.2(a), unless and until removed in accordance with Section 16.1, the Authority may take exclusive possession of all of Concessionaire's fixtures, furniture, equipment, improvements, additions, alterations and other personal property at the ATM Locations and the Ancillary Locations or other areas of the Airport, and to use the same, without rent or charge, until all defaults are cured, or, at its option, to require Concessionaire to forthwith remove to same.

(d) For computing "worth at the time of termination of the Base Fee" referred to in Section 12.2(a)(2), the Base Fee shall be assumed to be the average Base Fee for the immediately preceding two Fiscal Years, and the "worth at the time of termination" shall be computed by discounting such amount at one percentage point above the discount rate of the Federal Reserve Bank of San Francisco at the time of termination.

12.3 Waiver by Concessionaire.

(a) In the event of the lawful exercise by the Authority of any one or more of its rights and remedies, Concessionaire waives any and all rights of redemption or relief from

forfeiture under law, and further releases the Authority from any and all claims, demands and liabilities by reason of such exercise by the Authority.

(b) Concessionaire waives all claims and demands against the Authority for damages or loss arising out of or in connection with the Authority's exercise of its remedies following a Default Event.

(c) Except as shall arise out of the sole active negligence or the sole willful misconduct of the Authority, Concessionaire waives any and all claims or causes of action against the Authority, its officers, employees and agents for all of the following:

(1) Any loss, injury or damage arising or resulting from any act or omission of any invitee, licensee, concessionaire or other occupant of the Airport, or any person who uses the Airport.

(2) Any loss or damage to the property of, or injury or damage to Concessionaire, its officers, employees, agents, contractors or any other person, from any cause or condition arising at any time on account of Concessionaire's use of the Airport.

12.4 Cumulative Remedies; No Waiver by Authority. The various rights and remedies reserved to the Authority shall be cumulative, and, except as otherwise provided by law, the Authority may pursue any or all such rights and remedies, whether at the same time or otherwise, and no single right shall be deemed to be exclusive of any of the other or of any right or remedy allowed by law or in equity. No delay or omission of the Authority to exercise any right or remedy shall be construed as a waiver of any such right or remedy or waiver of any Default Event.

12.5 Performance of Concessionaire's Covenants by Authority. In the event that Concessionaire at any time fails to make any payment or perform any other act under this Agreement, the Authority shall have the right, but not the obligation, immediately or at any time thereafter, without notice or demand and without waiving any right or releasing Concessionaire from any obligation to the Authority, to make such payment or perform such other act for the account of Concessionaire, to the extent the Authority may deem desirable. In connection therewith, the Authority may pay reasonable expenses and employ counsel in instituting, prosecuting, or defending any action or proceeding under this Agreement. All sums so paid by the Authority and all expenses incurred in connection therewith, together with interest thereon at the rate of 1.5% per month (subject to the maximum rate permitted by law), shall be payable to the Authority on demand.

12.6 Excuse of Performance by Authority. The Authority shall be under no obligation to observe or perform any covenant of this Agreement on its part to be observed or performed for the benefit of Concessionaire, which accrues after the date of any Default Event, unless and until such Default Event is cured by Concessionaire or waived by the Authority.

12.7 Default by the Authority. The Authority shall not be deemed to be in default in the performance of any obligation unless and until it has failed to perform such obligation within 60 days following the delivery by Concessionaire of written notice specifying the obligation the Authority has failed to perform; provided, however, in the event that the nature of the Authority's obligation is such that more than 60 days are required for its performance, the Authority shall not

be deemed to be in default if it shall commence such performance within such 60 day period and thereafter diligently prosecutes the same to completion. In the event of the Authority's default under this Agreement, subject to the notice and cure provisions described above in this Section, Concessionaire's sole remedy shall be to terminate this Agreement, with no further obligation or liability by the Authority.

ARTICLE 13

DAMAGE AND DESTRUCTION

13.1 Destruction Covered by Insurance. In the event of total or partial destruction, injury, damage or loss of the ATM Installations and the Ancillary Installations, and such casualty is covered under a policy of insurance required under this Agreement to be carried by Concessionaire:

(a) This Agreement shall not terminate, and Concessionaire shall commence and complete, as soon as is reasonably possible, at its sole expense the repair or restoration of the ATM Installations and the Ancillary Installations, to substantially the same or better condition as they were in immediately before the destruction, injury, damage or loss.

(b) Concessionaire shall continue to pay Base Fee and all Additional Fees, and shall perform any other obligations which Concessionaire is required to perform (except for those obligations that are not feasible to be performed during any period of repair or restoration caused by such total or partial destruction).

13.2 Destruction Not Covered by Insurance. In the event an ATM Installation or an Ancillary Installation is damaged or destroyed by any casualty not covered under an insurance policy required to be maintained by Concessionaire pursuant to this Agreement:

(a) If the damage or destruction can be reasonably repaired or restored within two months after the date of commencement of repair or restoration, this Agreement shall not terminate and Concessionaire shall, as soon as reasonably possible, at its sole expense, repair and restore the ATM Installation or the Ancillary Installation, as applicable, to substantially the same or better condition as they were in immediately before the damage or destruction.

(b) If the damage or destruction cannot be reasonably repaired within two months after the date of commencement of repair or restoration, and neither party exercises its right to terminate, this Agreement shall not terminate and Concessionaire shall, at its sole expense, repair and restore the ATM Installation or the Ancillary Installation, as applicable, to substantially the same or better condition as they were in immediately before the damage or destruction.

(c) Concessionaire shall continue to pay Base Fee and all Additional Fees, and shall perform any other obligations which Concessionaire is required to perform (except for those obligations that are not feasible to be performed during any period of repair or restoration caused by such total or partial destruction).

13.3 Authority's Election to Terminate.

(a) If the ATM Installations and the Ancillary Installations are damaged or destroyed (whether by insured or uninsured casualty), and the repair or restoration of the damage or destruction cannot be repaired or restored, such that it can be reasonably anticipated that the ATM Concession will not be restored to the standards required under this Agreement within two months after the date of such damage or destruction, the Authority may terminate this Agreement. The Authority may, at its option, within 30 days after the date of such destruction event give notice of its election to terminate this Agreement as of the date of the occurrence of the destruction.

(b) If the Authority elects to terminate this Agreement pursuant subsection (a), Concessionaire shall have the right within five days after receipt of the notice, to notify Authority in writing of Concessionaire's intention to repair such destruction at Concessionaire's expense, in which event this Agreement shall continue in effect and Concessionaire shall proceed to complete such repairs as soon as reasonably possible (within two months after the date of destruction event), to restore the ATM Installations and the Ancillary Installations, as applicable, to substantially the same or better condition as they were in immediately before the destruction, injury, damage or loss. During the repair period, Concessionaire shall continue to pay, except as otherwise provided in this Article, Base Fee and all Additional Fees, and shall perform any other obligations which Concessionaire is required to perform (except for those obligations that are not feasible to be performed during any period of repair or restoration caused by the total or partial destruction).

(c) If Concessionaire does not give notice pursuant to subsection (b) within such 30 day period, this Agreement shall be terminated as of the date of the occurrence of such destruction.

(d) In all events (and notwithstanding any that may appear to be contrary in foregoing), if the damage or destruction is caused by an act or omission of Concessionaire or a Concessionaire Agent, then Concessionaire shall repair such damage or destruction promptly at its sole expense.

13.4 Concessionaire's Election to Terminate. If the destruction is to such an extent that the cost of replacing the destroyed ATM Installations and Ancillary Installations exceeds 50% of the estimated replacement cost of all of the ATM Installations and the Ancillary Installations, which damage or destruction cannot be reasonably repaired or restored within two months after the date of commencement of the repair or restoration, Concessionaire may terminate this Agreement but only if all of the following conditions are met:

(a) The damage or destruction was due to a casualty not covered under an insurance policy required to be maintained by Concessionaire pursuant to this Agreement.

(b) The damage or destruction was not caused by any act or omission of Concessionaire or Concessionaire Agent.

(c) Concessionaire, within 30 days after the date of the occurrence of such damage or destruction, provides the Authority with written notice of Concessionaire's election to terminate pursuant to this Section; provided that the termination date shall be at least 30 days from the date of such notice.

13.5 Procedure for Repair or Restoration. Within 30 days after the date on which Concessionaire is obligated to repair or restore an ATM Installation or an Ancillary Installation, Concessionaire shall prepare at its sole expense, and submit to the Authority for review and approval, drawings, plans and specifications in accordance with the applicable laws.

13.6 Other Requirements. In the event of repair or restoration affecting Concession Improvements, all other provisions of this Agreement that apply to Concessionaire's construction and installation of Concession Improvements shall apply.

13.7 Damage to Airport Facilities. With respect to any damage to any areas or facilities of the Airport:

(a) The Authority shall determine, in its sole discretion, whether to repair any damage to any such areas or facilities.

(b) If the damage is such that Concessionaire is totally or substantially prevented from physical access to hardware that is critical to the functioning of the ATM Concession to the standards required under this Agreement, the Authority may repair or restore the damage or give Concessionaire notice of the Authority's election to terminate this Agreement.

(c) Any damage to the Airport that is caused by the act or omission of Concessionaire, or a Concessionaire Agent, shall be repaired or restored by the Authority at Concessionaire's sole expense. Concessionaire shall reimburse the Authority for all costs and expenses of such repair or restoration, plus a percentage thereof for administrative overhead as such percentage is approved and established from time to time by the Authority, within 10 days after demand.

13.8 Waiver by Concessionaire. Concessionaire waives the provisions of any law that is contrary to the obligations of Concessionaire under this Section or that relieves Concessionaire from such obligations, or that places upon the Authority obligations to repair or restore any Airport facility. Under no circumstances shall the Authority have any obligation to repair, replace or re-install any damaged or destroyed portion of the ATM Installations or the Ancillary Installations or any improvements, furnishings, fixtures, or equipment, or other personal property of Concessionaire (or a Concessionaire Agent) at or around the Airport, except as may be expressly provided in this Agreement.

ARTICLE 14 CONDEMNATION

14.1 Condemnation. As used in this Article, "condemnation" shall mean the right of any government entity ("condemnor") to take property for public use, and shall include a voluntary sale or transfer by the Authority to the condemnor under threat of a taking under the power of condemnation or during the pendency of formal condemnation proceedings.

14.2 Notice to Other Party. The party receiving a notice of condemnation shall promptly give the other party a copy of the notice or a summary of the contents and date of the notice received.

14.3 Termination on Condemnation. This Agreement shall terminate as of the date that title of the property is transferred pursuant to the condemnation, if all of the following conditions are met:

(a) (i) The portion of the Airport that included the ATM Locations is totally or partially taken by condemnation, or (ii) the ATM Installations and the Ancillary Installations are totally or partially taken by condemnation.

(b) As the direct result of taking, the ATM Concession is prevented from performing to the standards required under this Agreement in the absence of a suitable replacement location.

(c) In case of a taking of ATM Locations or Ancillary Locations, the Authority does not make available replacement location(s) at the Airport that, in its judgement, would allow the ATM Concession to continue to operate at the level required under this Agreement without significant interruption.

14.4 Award. Awards and other payments on account of a taking of any portion of the ATM Locations or the Ancillary Locations shall be paid to the Authority, except that Concessionaire shall receive:

(a) Sums separately awarded to Concessionaire for: (i) the unamortized cost (as of the date of condemnation) of the Concession Improvements, determined by amortizing the cost over the Concession Period on a straight line basis; and (ii) for Concessionaire's personal property.

(b) Awards and payments received on account of a taking of only the right to use the ATM Locations and the Ancillary Locations under the license created by this Agreement (as evidenced by the plain wording of the related condemnation documents).

ARTICLE 15

ADDITION OR REMOVAL OR RELOCATION OF ATM LOCATIONS OR ANCILLARY LOCATIONS; TERMINATION FOR CONVENIENCE

15.1 Addition of ATM Locations. At any time, the Authority may determine to create additional ATM Locations (each an "Additional ATM Location") and give Concessionaire notice of such determination ("Notice for Additional Location"). The Authority and Concessionaire shall meet within 30 days of the Notice for Additional Location. Unless the Authority and Concessionaire agree to cancel the Additional ATM Location as the result of this meeting, Concessionaire shall, within 60 days of the Notice for Additional Location, submit a proposed Installation Plan for the Additional ATM Location. The parties shall proceed with the development of the new ATM Installations and related Ancillary Installations, if any, in substantially the same manner as prescribed in Article 10 for Initial Installations. All provisions of Article 10 shall apply, except: (i) the parties shall, by memorandum, establish the related deadlines, and (ii) with respect to each reference to the RPT Design-Builder in Article 10, the Authority may designate a different Authority Representative to serve the same role.

15.2 Removal or Relocation of Ancillary Installations. At any time the Authority determines that an Ancillary Installation shall be removed or relocated from one location (“Original Ancillary Location”) to another location at the Airport, Concessionaire shall take such steps as are necessary to (a) remove or relocate the item, and (b) restore the Original Ancillary Location to its condition prior to the installation of the removed items, with normal wear and tear and casualty loss excepted. The license granted to Concessionaire for use of the Original Ancillary Location for Concessionaire installations shall cease upon such removal or relocation. The cost of removal or relocation (and restoration of the Original Ancillary Location) shall be borne by Concessionaire. The removal or relocation shall be accomplished by Concessionaire within 90 days from receipt of the Authority’s notice; provided that if the Authority states in the notice that the removal or relocation is for public health and safety reasons or otherwise required by law, then Concessionaire shall complete and remove the item within the time specified in the notice.

15.3 Authority Election to Relocate ATM Locations or Terminate Agreement. At any time the Authority determines that one or all of the ATM Locations should be eliminated because of Airport operation needs:

(a) The Authority shall give Concessionaire 60-day advance notification and offer relocation options.

(b) Concessionaire shall notify the Authority in writing of any rejection of such offer within 30 days of the Authority’s notice. The absence of a rejection notice within the 30-days shall be deemed acceptance (and Concessionaire’s license to the eliminated location for the ATM Concession shall end as of the date specified in the Authority’s notification).

(c) If Concessionaire accepts the relocation offer, the parties shall negotiate, in good faith, for the payment of any relocation costs associated with such change.

(d) If Concessionaire rejects the relocation offer, or if the parties are unable to reach agreement regarding relocation cost (and if no related agreement is executed by the twentieth day before the proposed date of relocation, it shall be conclusive proof that the parties cannot reach agreement), the Authority may elect to terminate this Agreement.

(e) Each of the foregoing notification periods may be shortened, as reasonably determined by the Authority, if the elimination of the ATM Location is due to health and safety requirements or otherwise required by law.

(f) None of the foregoing shall impede Authority’s right to exercise remedies upon a Default Event. In case of a Default Event, Article 12 shall govern.

15.4 Concessionaire Election to Terminate. Concessionaire may terminate this Agreement for convenience if all of the following conditions have been satisfied:

(a) Concessionaire is not in default in its payment or other obligations to the Authority.

(b) The termination shall be at least 120 days from the date on which the Authority receives Concessionaire’s written notice.

(c) Concessionaire shall have remitted all unpaid amounts (including late charges and interest) payable by Concessionaire under this Agreement which have accrued to the date of termination.

(d) Concessionaire shall either:

(1) Pay the Authority an amount equal to the worth at the time of termination of the Base Fee which would have accrued under this Agreement from the date of termination until the Expiration Date (for this purpose, the Base Fee shall be assumed to be the average Base Fee for the immediately preceding two Fiscal Years, and the “worth at the time” shall be computed by discounting such amount at one percentage point above the discount rate of the Federal Reserve Bank of San Francisco at the time of termination).

(2) Continue to perform under this Agreement in all respects (including the payment of Concession Fee) until such time as the Authority has entered into a new agreement (or agreements) that would replace the services provided by the Concessionaire.

ARTICLE 16

REMOVAL OF PROPERTY UPON LICENSE TERMINATION; HOLDOVER; OWNERSHIP OF CONCESSION IMPROVEMENTS

16.1 Removal of Property Upon Termination.

(a) No notice to vacate on the termination date of this Agreement shall be given by the Authority. On the Expiration Date or date of earlier termination of this Agreement, Concessionaire shall peaceably and with due care remove trade fixtures, equipment, and other personal property installed or placed by it in, on, or about the Airport, subject, however, to any valid lien that the Authority may have for unpaid fees, and subject the provisions of Section 16.4 regarding the removal of Concession Improvements.

(b) Concessionaire shall not abandon any of its property at the ATM Locations or the Ancillary Locations. Property not removed by Concessionaire as of the Expiration Date (or any earlier termination) shall, at the option of the Authority, become a part of the land on which it is located and title shall vest in the Authority.

(c) Authority property damaged by or as the result of the removal of Concessionaire’s property shall be restored by Concessionaire, at Concessionaire’s expense, to the condition existing prior to such damage.

16.2 Holdover After End of Concession Period.

(a) Any holding over after the end of the Concession Period shall not constitute a renewal or an extension of the license granted hereunder or give Concessionaire any rights in or to the ATM Locations or the Ancillary Locations. If Concessionaire, with the Authority’s written consent, continues its use of the ATM Locations and the Ancillary Locations after the end of the Concession Period, such use shall be deemed a month-to-month extension of the license terminable by either party on 30 days’ notice. During such extension, all provisions of this Agreement

pertaining to Concessionaire's obligations (including all Concession Fee and any other amounts due) shall remain in effect, to the same extent as the Concession Period.

(b) With respect to any holding over to which the Authority has not consented, all provisions of this Agreement pertaining to Concessionaire's obligations shall remain in effect to the same extent as the Concession Period except that the Base Fee shall be increased to 150% of the Base Fee in effect at the end of the Concession Period and, without limiting the foregoing:

(1) Concessionaire shall provide a 30-day notice of its intent to vacate the premises or shall be subject to a fee equivalent to four months of the Base Fee per month during the holdover period.

(2) The Authority may, with written notice, take any legal action to remove Concessionaire from Airport premises.

(3) Concessionaire shall be responsible for payment of taxes for the entire following tax year without proration and the Authority shall be entitled to remove Concessionaire but may still collect Concession Fee owed by Concessionaire.

(4) Concessionaire shall indemnify the Authority against all damages arising out of Concessionaire's holdover, including any costs incurred by the Authority to remove Concessionaire.

(5) All insurance policies and the Performance Guarantee shall remain in effect while Concessionaire continues to use the ATM Locations and the Ancillary Locations.

(c) Any holding over without the Authority's written consent is a violation of this Agreement. Nothing in this Section shall be construed to limit any of the Authority's rights and remedies.

16.3 Holdover After Termination of License at a Specific Airport Location.

(a) If Concessionaire's license to use a specific location ("Deleted Location") at the Airport is revoked or otherwise terminated, any holding over of the Deleted Location shall not constitute a renewal or an extension of the license granted for the Deleted Location or give Concessionaire any rights in or to the Deleted Location. If Concessionaire, with the Authority's written consent, continues its use of the Deleted Location, such use by Concessionaire shall be deemed a month-to-month extension of the license terminable by either party on 30 days' notice. During such extension, all provisions of this Agreement pertaining to Concessionaire's obligations (including all Concession Fee and any other amounts due) shall remain in effect, to the same extent as the Concession Period, for the Deleted Location. Furthermore, unless otherwise modified by the Authority in writing, the Base Fee shall continue to be calculated to include revenues attributable to the Deleted Locations and accordingly continue to adjust annually.

(b) With respect to any holding over to which the Authority has not consented, all provisions of this Agreement pertaining to Concessionaire's obligations shall remain in effect and applicable to the Deleted Location to the same extent as the Concession Period, except as follows. A "Monthly Holdover Base Fee" shall apply to the Deleted Location equal to 150% of

the Base Fee in effect immediately before the deletion of the location. In addition to all other amounts due under this Agreement, Concessionaire shall pay the Monthly Holdover Base Fee for the holdover of the Deleted Location. Without limiting the foregoing and without affecting the Authority's rights with respect to the other ATM Locations and Ancillary Locations under this Agreement:

(1) Concessionaire shall provide a 30-day notice of its intent to vacate the Deleted Location or shall be subject to a fee equivalent to four months of the Base Fee per month during the holdover period.

(2) The Authority may, with written notice, take any legal action to remove Concessionaire from the Deleted Location.

(3) Concessionaire shall be responsible for payment of taxes relating to the Deleted Location for the entire following tax year without proration and the Authority shall be entitled to remove Concessionaire but may still collect Concession Fee owed by Concessionaire.

(4) Concessionaire shall indemnify the Authority against all damages arising out of Concessionaire's holdover, including any costs incurred by the Authority to remove Concessionaire.

(5) All insurance policies and the Performance Guarantee shall remain in effect with respect to the Deleted Location while Concessionaire is in possession of the Deleted Location.

(c) Any holding over at the Deleted Location without the Authority's written consent is a violation of this Agreement. Nothing in this Section shall be construed to limit any of the Authority's rights and remedies.

16.4 Ownership of Concession Improvements, Removable Fixtures; Removal.

(a) Concession Improvements installed at any location at the Airport that cannot be removed without causing substantial damage to the Airport property shall be part of the Airport and title thereof shall pass to the Authority immediately following installation, free and clear of all liens and encumbrances without payment of any consideration. Concessionaire shall not remove or demolish, in whole or in part, any Concession Improvements without the prior written consent of the Authority, which may, at its sole discretion, condition such consent upon the obligation of Concessionaire, at Concessionaire's cost, to replace the same by an improvement specified in such consent.

(b) Concessionaire shall retain ownership of all Removable Fixtures. Concessionaire may remove any of the Removable Fixtures at any time during the term. Unless otherwise agreed in writing by the Authority, Concessionaire shall remove all Removable Fixtures prior to the expiration or termination of this Agreement. Any Removable Fixtures or other property of Concessionaire not removed by the deadline shall, at the election of the Authority, become the property of the Authority without payment to Concessionaire, or be deemed abandoned and removed by the Authority, at Concessionaire's expense. Upon any removal of such property, Concessionaire shall promptly repair any and all damage to the ATM Location or Ancillary

Location, as applicable, and reimburse the Authority for its costs and expenses in removing any such property not removed by Concessionaire and repairing any such damage not repaired by Concessionaire. This covenant shall survive the expiration or termination of this Agreement.

(c) At the expiration or termination of this Agreement, the Authority may require some or all of the Concession Improvements to be removed by Concessionaire. In such event Concessionaire shall, at its sole expense, remove Authority-designated Concession Improvements, safely cap all utilities, and return the premises in a level condition with all debris removed, if so required by the Authority. The Authority shall accept Concession Improvements only without cost to the Authority and free and clear of any encumbrances, with Concession Improvements and all alterations and additions functioning and in a good state of repair, reasonable wear and tear excepted.

ARTICLE 17

ALTERATIONS; CONCESSIONAIRE IMPROVEMENTS

17.1 Construction.

(a) Authority Consent; Tenant Request Form. Concessionaire shall not, without in each instance obtaining the Authority's prior consent (which consent may be granted or withheld in the Authority's sole and absolute discretion), construct, install or make any modifications, alterations, improvement, or additions ("Alterations") in, on or to any ATM Location or Ancillary Location. Concessionaire shall submit a written request of the proposed Alterations in the form required by the Authority, currently entitled the "Tenant Improvement Request." Upon request, the Authority shall promptly provide the then-current Tenant Improvement Request form. The Authority may change such standard form from time to time.

(b) Additional Conditions. Alterations approved by the Authority to be made by Concessionaire ("Concessionaire Improvements") shall be subject to conditions imposed by the Authority in its sole discretion. Such conditions may include requirements as to the contractor, time, manner, method, design and construction in which the Concessionaire Improvements shall be done.

(c) Concessionaire Responsible for Permits and Other Authorizations. No Concessionaire Improvements shall be undertaken until Concessionaire shall have procured and paid for all required permits, licenses, approvals and authorizations of all agencies having jurisdiction and the Authority's written consent to commence work. Prior to the commencement of any Concessionaire Improvements, Concessionaire shall comply with the Authority's instructions and requirements set forth in the Tenant Improvement Request. All plans shall be subject to the Authority's approval and, when required by the Airport Engineer, shall be prepared, stamped and signed by a State-licensed architect or engineer. Engineers shall be licensed for the particular discipline required.

(d) Diligence; Compliance with Law. All work done in connection with any Concessionaire Improvements shall be done at Concessionaire's sole expense and with reasonable diligence, in a good and workmanlike manner, and in compliance with applicable laws.

(e) Plans and Specifications. In order to expedite plan review and approval and to ensure that the proposed Concessionaire Improvements will be compatible with the Airport uses, Concessionaire first shall submit to the Authority for approval a schematic or conceptual plan. The Authority shall have the right to inspect and reject any work not done in accordance with the plans and specifications approved by the Authority, and Concessionaire shall immediately repair or remove such work. Within 30 days following the completion of any Concessionaire Improvements, Concessionaire shall furnish to the Authority a set of “as built” plans and specifications.

(f) No Effect on Agreement Term. Concessionaire’s construction or installation of Concessionaire Improvements shall not extend the term of this Agreement nor impede each party’s right to termination.

17.2 Authority’s Assumption of Concessionaire Improvements. If a Default Event by Concessionaire occurs before completion of work for a Concessionaire Improvement, the Authority shall have the right to assume the work and to continue the contracts of Concessionaire with its contractors and suppliers. A provision substantially similar to the following shall be included in all contracts between Concessionaire and its contractors and suppliers in order to comply with this Section:

“The Burbank-Glendale-Pasadena Airport Authority (Authority) shall have the right (but not the obligation) to assume Concessionaire’s project under the terms of its Agreement with Concessionaire, to continue this contract between Concessionaire and contractor or supplier, upon assuming in writing all the liabilities of Concessionaire under this contract between Concessionaire and contractor or supplier; and the Authority shall receive all the rights, title, interests and remedies that Concessionaire has under the terms of this contract between Concessionaire and contractor or supplier. The Authority shall have the right to demand and collect (including a suit for damages and cost of litigation and reasonable attorney fees) from Concessionaire all costs incurred by the Authority in assuming the obligations of Concessionaire.”

17.3 No Liability of Authority. The Authority shall not be liable for any damage, loss, or prejudice suffered or claimed by Concessionaire, its agents or any other person or entity on account of: (i) the approval or disapproval of any plans, contracts, bonds, contractors, sureties or other matters; (ii) the construction or installation of any Concessionaire Improvements or performance of any work, whether or not pursuant to approved plans; (iii) the improvement of or alteration or modification to any portion of the ATM Location or Ancillary Location (except to the extent performed by the Authority); or, (iv) the enforcement or failure to enforce any of the covenants, conditions and restrictions contained in this Agreement. The Authority’s approval of Concessionaire’s plans, or requirement that Concessionaire modify Concessionaire’s plans, shall not be deemed the Authority’s express or implicit covenant or warranty that such plans are safe or comply with any or all laws.

17.4 Payment. Concessionaire shall pay, when due, all claims for labor, materials, equipment and services furnished or alleged to have been furnished to or for Concessionaire at or for use in the ATM Locations, Ancillary Locations or any other areas of the Airport, which claims are or may be secured by any lien against the ATM Locations, Ancillary Locations or any other areas of the Airport. In the event any such lien is filed against the ATM Locations, Ancillary Locations or any other areas of the Airport in connection with Concessionaire Improvements, it shall be discharged by Concessionaire, at Concessionaire's expense, in accordance with Section 23. The Authority shall have the right to post such notices of nonresponsibility as are provided for in the mechanics' lien laws of the State.

ARTICLE 18 INSURANCE

18.1 General.

(a) Concessionaire shall procure and maintain at its sole expense, and always keep in effect during the term of this Agreement, the types and levels of insurance prescribed below. Such insurance requirements do not in any way limit the amount or scope of liability of Concessionaire under this Agreement.

(b) Upon execution of this Agreement and throughout the Concession Period, Concessionaire shall provide the Authority current certificates of insurance establishing the existence of all required insurance policies.

(c) The Authority shall be given no less than 30 days prior written notice of cancellation, non-renewal, or material change in any policy. Insurance shall be maintained without any lapse in coverage during the term of this Agreement. Insurance canceled without Authority consent shall be deemed an immediate Default Event.

(d) Failure of the Authority to demand such certificate or other evidence of full compliance with these insurance requirements, or failure of the Authority to identify a deficiency from the evidence provided, shall not be construed as a waiver of Concessionaire's obligations to maintain the insurance required by this Agreement.

18.2 Commercial General Liability. Concessionaire shall maintain an occurrence form commercial general liability policy or policies, in the amount of coverage not less than \$1,000,000 per occurrence, insuring against liability for personal injury, bodily injury, death, and damage to property (including loss of use thereof) and occurring on or in any way related to the ATM Installations, Ancillary Installations or occasioned by reason of the operations of Concessionaire. Such insurance shall include coverage for the following: (a) premises coverage; (b) products of completed operations; (c) broad form contractual liability; (d) personal injury; (e) broad form property damage; (f) cross liability; (g) broad form named insured; (h) fire legal; and (i) advertising injury.

18.3 Commercial Automobile Liability. In the event that automobiles are used in connection with Concessionaire's business or operations at the Airport, Concessionaire shall maintain an automobile liability policy or policies insuring against liability for bodily injury, death, or damage to property, including loss of use thereof, and occurring in any way related to the use,

loading or unloading of any of Concessionaire's automobiles (including owned, hired and non-owned vehicles) at and around the Airport. Coverage shall be in an amount of not less than \$1,000,000 each accident.

18.4 Workers' Compensation and Employer's Liability. Concessionaire shall maintain workers' compensation insurance written in accordance with California statutory limits and employer's liability insurance, in amounts not less than the following:

- (a) Bodily injury by accident - \$1,000,000 - each accident
- (b) Bodily injury by disease - \$1,000,000 - policy limit
- (c) Bodily injury by disease - \$1,000,000 - each employee

The employer's liability insurance shall not contain an occupational disease exclusion.

18.5 Property Insurance. Concessionaire shall maintain in effect property insurance written on an all risk of direct physical loss basis covering Concessionaire's fixtures, personal property, and equipment located at the Airport in an amount not less than 100% of the replacement value thereof. The proceeds of such insurance shall be used to repair or replace the insured property. The policy shall include the Authority as loss payee as respects to its interests.

18.6 Commercial Crime Insurance. Concessionaire shall procure and maintain Commercial Crime insurance in an amount not less than \$1,000,000 that covers loss arising from employee theft, employee dishonesty, forgery or alteration, robbery, burglary, embezzlement, disappearance, destruction; money orders and counterfeit currency; depositors forgery; and computer fraud on-premises and in-transit.

18.7 Concessionaire's Risk. Concessionaire shall be responsible for obtaining any insurance that is necessary to cover its own risks. In no event shall the Authority be liable for any: (a) business interruption or other consequential damages sustained by Concessionaire; (b) damage, theft or destruction of Concessionaire's inventory, Concession Improvements, or property of any kind; or (c) damage, theft or destruction of an automobile, whether or not insured.

18.8 Additional Requirements.

(a) All liability policies shall be endorsed to include the Authority Indemnities as additional insureds with respect to Concessionaire's, and Concessionaire Agents', acts or omissions, operations, use, and occupancy of the Airport, or other related functions performed by or on behalf of Concessionaire in, on or about the Airport.

(b) All such insurance shall be primary and noncontributing with any other insurance held by or on behalf of any Authority Party where liability arises out of or results from the acts or omissions of Concessionaire or Concessionaire Agents.

(c) Such policies may provide for reasonable deductibles and/or self-insured retentions. All self-insured retentions shall be declared to the Authority and approved in writing,

on a case-by-case basis, based upon the nature of Concessionaire's operations and the type of insurance involved.

(d) Each such insurance policy shall include a waiver of subrogation endorsement in favor of the Authority Parties.

(e) The Authority shall have no liability for any deductibles, self-insured retentions, or premiums charged for such coverage(s). The inclusion of any of the Authority, the Authority Commission, and all its officers, employees, and agents, their successors, and assigns, as an additional insured is not intended to, and shall not, make them, or any of them, a partner or joint venture with Concessionaire in its operations at the Airport or connected with this Agreement.

(f) The insurance policy limits specified herein shall be reviewed for adequacy annually by the Authority which may, thereafter, require Concessionaire to adjust the insurance coverage to whatever reasonable requirement the Authority deems to be adequate. Concessionaire shall provide the Authority with proof of such compliance by giving the Authority an updated certificate of insurance within 30 days of Authority's written notice.

(g) All insurance policies required herein shall have a rating of not less than "A" in A.M. Best's Insurance Guide or otherwise acceptable to the Authority.

(h) At least 10 business days prior to the expiration date of all policies, documentation showing that the insurance coverage has been renewed or extended shall be filed with the Authority. If such coverage is canceled, Concessionaire shall, within 15 days of such cancellation, file with the Authority evidence that the required insurance coverage has been reinstated without lapse or provided through another insurance company or companies.

18.9 Proof of Insurance.

(a) Concessionaire shall provide proof of the requested insurance to the Authority in the following manner:

(1) Certificate(s) of Insurance evidencing all specified coverage shall be filed with the Authority prior to Concessionaire performing under this Agreement or use of ATM Locations or Ancillary Locations and at other times upon request of the Authority. The Certificate(s) shall contain the applicable policy numbers, the inclusive dates of policy coverage, the insurance carrier's name, the insurance broker's name, address and telephone number, shall bear an original signature of an authorized representative of such carrier, and shall provide that such insurance shall not be subject to cancellation, or non-renewal except after written notice by certified mail, return receipt requested, to the Authority at least 30 days prior to the effective date thereof. The Authority shall have the right to receive, upon request, all pertinent information about the broker and carrier providing such insurance.

(2) Additional Insured Endorsement(s) shall be filed with the Authority prior to Concessionaire making ATM Installations and Ancillary Installations.

(3) Waiver of Subrogation Endorsement(s) shall be filed with the Authority prior to Concessionaire making ATM Installations and Ancillary Installations.

(4) If requested by the Authority, when coverage is provided by foreign insurance syndicates, a broker's letter that is acceptable to the Authority in form and content.

(5) If requested by the Authority, other written evidence of coverage that is acceptable to the Authority.

(b) Submission of insurance from a non-California admitted carrier is subject to the provisions of Insurance Code Sections 1760 through 1780, and any other regulations and/or directives from the State Department of Insurance or other regulatory board or agency. Concessionaire shall, except where exempted, provide the Authority proof of such insurance by and through a surplus line broker licensed by the State of California.

(c) The procuring of such required policies of insurance shall not be construed to limit Concessionaire's liability, nor to fulfill the indemnification requirements of this Agreement. Notwithstanding such policies of insurance, Concessionaire shall be obligated for the full and total amount of any damage, injury, or loss caused by Concessionaire, including Concessionaire Agent(s), and connected with this Agreement or use of Airport properties and facilities by Concessionaire, including Concessionaire Agent(s), if any.

18.10 Insurance Requirements for Concessionaire Agents. Concessionaire shall require all Concessionaire Agents (other than Concessionaire's employees) in connection with the use of Airport properties and facilities to carry and maintain coverage with limits not less than those required of Concessionaire in this Agreement. Concessionaire shall incorporate this insurance requirement by reference within any contract executed by Concessionaire and shall cause each Concessionaire Agent to comply with the terms of this Agreement. Concessionaire will obtain and verify the accuracy of certificates of insurance evidencing the required coverage prior to permitting Concessionaire Agents to perform work for ATM Concession components, the ATM Installations, the Ancillary Installations or any other services on Airport property. Concessionaire shall furnish certificates of insurance with additional insured endorsements and waivers of subrogation as applicable from all of Concessionaire Agents as evidence thereof as the Authority may reasonably request.

ARTICLE 19 INDEMNIFICATION; HOLD HARMLESS

19.1 Concessionaire Indemnification of Authority.

(a) To the fullest extent permitted by law, Concessionaire shall defend, indemnify, and hold harmless the Authority Indemnitees from and against any and all liabilities, liens, claims, judgments, demands, causes of action, losses, damages, costs, and expenses (including reasonable attorneys' fees and costs) (collectively, the "Liabilities"), arising out of, related to, or in any way connected with this Agreement, the ATM Concession, including any related: (i) actions or omissions of Concessionaire or the Authority; (ii) obligations or activities undertaken in connection with this Agreement; (iii) damage to any person or property, or injury to or death to any person, including any claim or action alleging latent and other defects, whether or not discoverable by Concessionaire or the Authority; (iv) alleged or actual breach of any laws; and

(v) duties under easements or contracts with third parties; except that this requirement shall not apply to any Liabilities arising through the sole negligence or willful misconduct of the Authority.

(b) These indemnity obligations shall apply for the entire time that any third party can make a claim against or sue the Authority Indemnitees and shall survive the expiration or termination of this Agreement. Concessionaire and the Authority shall promptly provide notice to each other of any Liabilities. Within seven days of receiving the Authority's notice, Concessionaire shall respond to the Authority in writing regarding Concessionaire's plan of action. Concessionaire shall not settle, compromise any claim or matter, or admit liability or fault on the part of the Authority without first obtaining Authority's written consent. Maintaining the insurance required under this Agreement shall not affect Concessionaire's indemnity obligations.

19.2 Subcontractor Indemnification of Authority. Concessionaire shall include in its Subcontracts the language of this Article indemnifying the Authority Indemnitees from any and all Liabilities arising out of, related to, or in any way connected with this Agreement. These indemnity obligations shall apply for the entire time that any third party can make a claim against or sue the Authority Indemnitees and shall survive the expiration or termination of any such Subcontract. Any Subcontractor shall promptly provide notice to Concessionaire and the Authority of any Liabilities. Within seven days of receiving the Authority's notice, Subcontractor shall respond to the Authority in writing (with a copy to Concessionaire) regarding Subcontractor's plan of action. Subcontractors shall not settle, compromise any claim or matter, or admit liability or fault on the part of the Authority without first obtaining the Authority's written consent.

19.3 Disclaimer of Liability. The Authority disclaims, and Concessionaire releases the Authority, to the extent allowed by law, from any and all liability, whether in contract or tort (including strict liability, negligence, and nuisance), for any loss, damage, or injury of any nature whatsoever sustained by Concessionaire or any Concessionaire Agent including loss, damage or injury to any ATM Installation, Ancillary Installation or personal property of Concessionaire, unless such loss, damage or injury is caused solely by the Authority's negligence or intentional misconduct. Under no circumstances shall the Authority be liable for indirect, consequential, special, or exemplary damages whether in contract or tort (including strict liability, negligence, and nuisance), including loss of revenue or anticipated profits. The Authority shall have no liability whatsoever and Concessionaire releases and agrees to hold harmless the Authority from any and all liability relating to any information provided by the Authority, including any historical or forecasted air traffic or passenger traffic flow information, or the accuracy thereof, or the actual air or passenger traffic. Concessionaire acknowledges and agrees that its use of any such information is at its sole risk.

ARTICLE 20

ENVIRONMENTAL PROTECTION

20.1 Definitions. As used in this Article, the following definitions shall apply:

(a) **"Environmental Laws"** shall mean any federal, state, local or administrative law, rule, regulation, order or requirement relating to industrial hygiene, environmental conditions or Hazardous Materials, whether now in effect or hereafter adopted, including the Comprehensive Environmental Response, Compensation and Liability Act of 1980,

as amended (42 U.S.C. §§9601, et seq.), the Resources Conservation and Recovery Act of 1976 (42 U.S.C. §§6901, et seq.), the Clean Water Act (33 U.S.C. §1251, et seq.), the Safe Drinking Water Act (42 U.S.C. §§300f, et seq.), the Hazardous Materials Transportation Act (49 U.S.C. §§5101, et seq.), the Toxic Substance Control Act (15 U.S.C. §§2601, et seq.), the California Hazardous Waste Control Law (California Health and Safety Code §§25100, et seq.), the Porter-Cologne Water Quality Control Act (California Water Code §§13000, et seq.), and the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Health and Safety Code §§25249.5, et seq.).

(b) **“Environmental Damages”** means all claims, fees and expenses of defense of any claim and of any settlement or judgment, including reasonable attorneys’, consultants’, contractors’, experts’ and laboratory fees, any of which are incurred at any time as a result of the presence of Hazardous Materials, Regulated Materials and Pollutants upon or about an ATM Installation or an Ancillary Installation or migrating or threatening to migrate to or from an ATM Installation or an Ancillary Installation, or the existence of a violation of Environmental Laws pertaining to an ATM Installation or an Ancillary Installation or Concessionaire’s operations at the Airport including fees incurred in connection with a Response, or a violation of Environmental Laws. Environmental Damages does not include any claims, fees or expenses of defense of any claim or of any settlement or judgment, including reasonable attorneys’, consultants’, contractors’, experts’ and laboratory fees, any of which are incurred at any time as a result of Authority’s sole active negligence or willful misconduct.

(c) **“Hazardous Material, Regulated Material and/or Pollutant”** shall mean any material that, because of its quantity, concentration or physical or chemical characteristics, is deemed by any federal, state or local governmental authority to pose a present or potential hazard to human health or safety or to the environment. “Hazardous Material, Regulated Material and Pollutant” includes any material or substance defined as a “hazardous substance,” or “pollutant” or “contaminant” pursuant to any Environmental Law; any asbestos and asbestos containing materials; petroleum, including crude oil or any fraction thereof, natural gas or natural gas liquids; and any materials referenced in the Airport Rules and Regulations.

(d) **“Release”** with respect to Hazardous Material, Regulated Material and Pollutants shall include any actual or imminent spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into on any property or the environment, and includes any threat of Release to the extend regulated under Environmental Laws.

(e) **“Response”** or **“Respond”** means action taken in compliance with Environmental Laws to correct, remove, remediate, clean-up, prevent, mitigate, treat, monitor, evaluate, investigate, assess or abate the Release of any Hazardous Material, Regulated Materials and Pollutants, or to prevent or abate any public nuisance.

20.2 Concessionaire Representations, Warranties, and Covenants.

(a) Concessionaire shall comply and shall ensure that Concessionaire Agent(s) comply with all applicable Environmental Laws pertaining to its and their use of, and operations at, the Airport.

(b) Concessionaire shall, and shall ensure that Concessionaire Agent(s), handle, use, store, dispose of, transport, or otherwise manage, any Hazardous Materials, Regulated Materials and Pollutants at the Airport in a lawful manner.

(c) Concessionaire shall obtain and regularly maintain all necessary licenses, permits, registrations and other authorizations and approvals required under Environmental Laws, and shall provide any notices required under Environmental Laws, for conducting its operations at the Airport.

(d) Concessionaire shall promptly provide the Authority with a copy of any application filed and/or permit received for the use or storage of Hazardous Materials, Regulated Materials and Pollutants on the Airport, or report arising out of or in connection with any Hazardous Materials, Regulated Materials and Pollutants pursuant to any Environmental Laws or permits on or about an ATM Installation or an Ancillary Installation.

20.3 Environmental Sustainability Programs.

(a) The Authority is committed in its efforts to reduce the environmental footprint of the Airport, integrate sustainable practices into Airport operations, and respond to community concerns while providing economic benefits to the region. The Authority is dedicated to reducing the Airport's greenhouse gas emissions year after year to minimize the Airport's carbon footprint over time. Further, the Authority has pledged to reach carbon neutrality at the Airport by 2045, consistent with City of Burbank and State of California goals. Carbon reductions will be measured on a per-passenger basis for emissions under the Authority's control (known as Scope 1 and 2 emission sources) including fleet and heavy-duty vehicles, emergency generators, firefighting training, refrigerant losses, and purchased electricity. The Authority will strive to achieve these reductions through initiatives such as the clean fleets program, sustainable design and construction program, and renewable energy projects. These advances toward sustainability will support the Authority's objective to serve its guests while minimizing environmental impacts. The Authority specifically reserves the right to modify the Airport's environmental goals, sustainability initiatives, policies, and procedures as stipulated in the Airport Rules and Regulations. Concessionaire shall comply with applicable Environmental Laws.

(b) In the event that Concessionaire becomes authorized to operate a motor vehicle in the Airfield Operations Area, Concessionaire shall be required to comply with the Authority's Air Quality Improvement Plan ("AQIP") / Memorandum of Understanding ("MOU") with the South Coast Air Quality Management District and federal, state, and local regulations to reduce emissions from operations. The AQIP/MOU is available on the Authority's website or by request to the Authority.

(c) From time to time the Authority shall publish requirements applicable to Concessionaire and other Airport users as part of the Sustainability Program. Concessionaire shall comply with all such requirements.

20.4 Concessionaire Environmental Reporting and Response Requirements.

(a) In the event Concessionaire receives any written notice, citation, order, warning, complaint, claim, or demand from a government entity regarding Concessionaire's use

of, or operations at an ATM Location or an Ancillary Location concerning any alleged Release of a Hazardous Materials, Regulated Materials or Pollutants, Concessionaire shall promptly, but not later than five business days after Concessionaire's receipt, inform the Authority, including a copy of such notice received by Concessionaire.

(b) In the event Concessionaire or Concessionaire Agent(s) cause, in whole or in part, unlawfully allow or contribute to a Release of any Hazardous Material, Regulated Material or Pollutants at the Airport that may be in violation of any applicable Environmental Laws or that is above any applicable reportable quantity, emission standard or effluent guideline set forth in any applicable Environmental Laws, Concessionaire shall report such Release to the appropriate governmental authorities in compliance with applicable Environmental Laws.

(c) Concessionaire shall promptly respond to the Release of a Hazardous Materials, Regulated Materials or Pollutants, as required by applicable Environmental Laws and promptly take all further removals, remediation, or corrective actions required under Environmental Laws to abate any threat to human health or the environment or any other resulting impacts.

(d) Any remedial or other activity undertaken by Concessionaire under this Article shall not be construed to impair Concessionaire's rights, if any, to seek contribution or indemnity from any person, consistent with this Agreement.

20.5 Environmental Indemnification and Reimbursement.

(a) Notwithstanding any other provision to the contrary, Concessionaire shall indemnify, defend, and hold harmless Authority Indemnitees from and against any and all Environmental Damages resulting from the failure of Concessionaire to meet its obligations under this Agreement, whether caused, in whole or in part, or unlawfully allowed by Concessionaire, a Concessionaire Agent, or any other third party under Concessionaire's direction or control.

(b) The Authority shall provide Concessionaire with prompt notice of any Environmental Damages to allow Concessionaire the opportunity to properly and effectively respond to or otherwise defend such Environmental Damages. Concessionaire shall, at its sole expense, defend all Environmental Damages whether frivolous or not.

(c) In the event the Authority undertakes any action, including investigations, removals, remediation, or corrective actions with respect to any Environmental Damages in response to the failure of Concessionaire to defend such Environmental Damages, Concessionaire shall reimburse the Authority, upon written demand by the Authority, for all reasonable and documented costs that the Authority incurs in association with such action, including consultants' fees, contractors' fees, reasonable attorneys' fees and expenses of investigation, removal, Response, remediation, or corrective action.

(d) Except to the extent arising out of the sole active negligence or willful misconduct of the Authority Indemnitees, Concessionaire waives the right of contribution and subrogation against the Authority Indemnitees in connection with Environmental Damages set forth herein. Any claims for environmental matters shall be subject to this Article.

20.6 Limitations. Notwithstanding anything contained in this Agreement to the contrary, Concessionaire's obligations under this Article, including Concessionaire's indemnity, is limited to those Hazardous Materials, Regulated Materials and Pollutants first brought, created, disposed, fashioned, or caused to be exposed or released onto the Airport by or on behalf of Concessionaire or Concessionaire Agent(s), and Concessionaire shall not be responsible for nor required to indemnify the Authority Indemnitees for any other Hazardous Materials, Regulated Materials or Pollutants discovered at the Airport.

ARTICLE 21

GENERAL PROHIBITION AGAINST ASSIGNMENT OR SUBLICENSE

21.1 No Assignment or Sublicensing Without Consent.

(a) Concessionaire shall not in any manner, by operation of law or otherwise, assign, hypothecate, encumber, or transfer this Agreement or any of the rights, duties, or obligations under this Agreement, in whole or in part, voluntarily or involuntarily, or by operation of law (each, a "Transfer"), without the prior written consent of the Authority. Any attempted or purported assignment of any right or obligation pursuant to this Agreement, without such consent, shall be voidable at the discretion of the Authority and grounds for termination of this Agreement. The acceptance by the Authority of any Concession Fee or other payment as provided in this Agreement or the continuation of the use of the ATM Locations and Ancillary Locations, as provided herein, by Concessionaire or purported transferee or successor-in-interest, shall not be deemed a waiver of such right to terminate.

(b) Any request by Concessionaire for approval of a sublicense, assignment, mortgage, pledge or other encumbrance to any third party that is not an affiliate of Concessionaire shall be subject to an administrative fee (at an amount determined by the Authority but not more than \$1,000 for each request) for costs incurred by such request, which shall be submitted at the time of the request. The payment of this administrative fee is not guarantee of approval.

21.2 Limited Effect of Consent. Consent by the Authority to any Transfer shall not in any way be construed to relieve Concessionaire from obtaining further authorization from the Authority for any subsequent Transfer.

ARTICLE 22

TAXES, ASSESSMENTS, AND CHARGES

22.1 Taxes, Assessments and Other Charges.

(a) Concessionaire shall pay before delinquency, and without notice or demand, all applicable sales, use, intangible and possessory interest tax, and any other taxes, assessments, and charges levied or imposed against the ATM Installations, Ancillary Installations, and personal property used in the performance of Concessionaire's activities at the Airport, or that result from Concessionaire's occupancy or use of any Airport facilities, or that are assessed on any payments made by Concessionaire under this Agreement, whether levied against Concessionaire or the Authority. Concessionaire shall, at its sole expense, clear any lien created by virtue of such tax, assessment or charge. Any such payment shall not reduce the amount of the Concession Fee otherwise required to be paid by Concessionaire to the Authority.

(b) Concessionaire shall promptly pay any penalty or other charge which may be due and payable to Authority or any other party or government entity in connection with this Agreement and all rights and privileges.

(c) Concessionaire shall promptly pay any tax or other charge which is measured by the amount of revenues earned by Concessionaire, including, any income tax or excise tax levied by the City of Burbank, the County of Los Angeles, the State of California, the federal government, or any other government entity.

(d) The Authority makes no representation regarding whether Concessionaire might be subject to any possessory interest tax. If a possessory interest tax is levied or imposed, then Concessionaire shall pay such tax when due without any credit or offset to the moneys that are due and payable to the Authority.

(e) To the extent that the Authority forwards to Concessionaire a bill or assessment notice relating to a tax, assessment, or charge coming due for which Concessionaire is responsible, Concessionaire shall pay the tax, assessment, or charge promptly before the due date (and concurrently notify the Authority of such payment).

22.2 Contest of Tax or Charge.

(a) In the event that Concessionaire desires, in good faith, to contest or review by appropriate legal proceedings any tax, assessment, or charge imposed by another government entity, Concessionaire, at least 10 days prior to delinquency, shall give the Authority notice of its intention to contest such tax or charge.

(b) Concessionaire may withhold payment of the tax, assessment or charge being contested if nonpayment is permitted during the pendency of such proceedings without the imposition or foreclosure of any related lien or the imposition of any fine or penalty. The contest shall be prosecuted to completion (whether or not this Agreement has expired or terminated) without delay at Concessionaire's sole expense.

(c) Within such 10-day period or the applicable period of time allowed by law after the final determination of the amount due, Concessionaire shall pay such amount, together with all costs, expenses and interest (whether or not this Agreement has then expired or terminated).

22.3 Payment by Authority. If Concessionaire fails to pay any tax, assessment, or charge, the Authority may, after five days' notice to Concessionaire, pay, discharge, or adjust such tax, assessment, or charge for Concessionaire's benefit. In such event, Concessionaire, on receipt of written demand of the Authority, shall reimburse the Authority promptly for the full amount with interest at the rate of 1.5% per month (subject to the maximum rate permitted by law). Any receipt showing payment by the Authority shall be prima facie evidence that the amount of such payment was necessary and reasonable and made by the Authority on Concessionaire's behalf.

ARTICLE 23 DISCLAIMER OF LIENS

23.1 Creation of Lien Prohibited.

(a) As used in this Article, “Lien” shall mean and refer to any mortgage, lien, security interest, encumbrance, charge on, pledge of, conditional sale or other encumbrance on the Airport Terminal, an ATM Location, an Ancillary Location, or any Concessionaire Improvement, fixture, improvement or appurtenance.

(b) Concessionaire shall not directly or indirectly create or permit or suffer to be created and/or to remain, any mechanics’ or materialman’s Lien upon any Airport property, including any fixtures, improvements or appurtenances thereto, except those Liens expressly permitted in writing by the Authority, by reason of construction, labor, services, or materials performed or furnished at request of Concessionaire or any contractor or supplier employed by Concessionaire. Nothing herein impedes the Authority’s right to post and keep on the ATM Locations and the Ancillary Locations any notices that may be required by law or which Authority may deem proper for the protection of Authority and the Airport property from such Liens.

(c) In the event any Lien has been created by or permitted by Concessionaire in violation of this provision, Concessionaire shall within 10 days of the filing thereof, cause such Lien to be discharged as of record, by bond or as otherwise allowed by law.

23.2 Authority Right to Clear. In the event of Concessionaire’s failure to clear the record of any such Lien within such time period, the Authority may (but is not required to) remove such Lien by paying the full amount or by bonding or in any other manner the Authority deems appropriate, without investigating the validity of such Lien, and irrespective of the fact that Concessionaire may contest the propriety or the amount. Concessionaire, upon demand, shall pay the Authority the amount so paid out by the Authority in connection with the discharge of such Lien, together with interest thereon at the rate of 1.5% per month or the maximum legal rate, whichever is greater, and reasonable expenses incurred in connection therewith, including reasonable attorneys’ fees, which amounts are due and payable to the Authority as Additional Fees on the first day of the next following month.

23.3 No Consent by Authority. Nothing contained in this Agreement shall be construed as a consent on the part of the Authority to subject the Authority’s estate in any portion of the Airport to any Lien or liability under the laws of the State of California.

23.4 Survival. Concessionaire’s obligations under this Section shall survive expiration or termination of this Agreement.

ARTICLE 24 SUBORDINATION

24.1 Subordination. This Agreement is subject and subordinate to all mortgages, deeds of trust, bond indentures, liens and other encumbrances, security interests now or hereafter affecting the Airport premises, and to all renewals, modifications, replacements, consolidations and extensions thereof. Concessionaire shall execute and deliver to the Authority or any other

party requiring such subordination, within 10 days following its receipt, any and all documents which may be required to effectuate such subordination. This Agreement shall be amended, altered or modified in accordance with the reasonable requirements of a mortgagee, beneficiary, bond trustee, secured party or other lien holder, so long as such amendment, alteration or modification does not cause Concessionaire material financial loss, and that Concessionaire written consent to any such amendment, alteration or modification shall not be unreasonably withheld or delayed. Concessionaire shall give prompt written notice to each mortgagee, beneficiary, bond trustee, secured party or lien holder, of which Concessionaire has written notice, of any default of the Authority, and Concessionaire shall allow such mortgagee, beneficiary, bond trustee, secured party or lien holder a reasonable length of time (in any event, not less than 30 days from the date of such notice) in which to cure such default.

24.2 Transfer in Event of Foreclosure. In the event that any mortgage, deed of trust, bond indenture, security interest, lien or other encumbrance is foreclosed, Concessionaire, with and at the election of the purchaser or, if there is no purchaser, with and at the election of the holder of the fee title to the Airport premises, shall enter into a new contract covering the ATM Locations and the Ancillary Locations for the remainder of the Concession Period, on the same provisions herein provided.

24.3 Subordination to U.S. Government Agreements. This Agreement shall be subordinate to the provisions of any existing or future agreement between Authority and the United States Government relative to the operation or maintenance of the Airport, the execution of which has been or may be required as a condition precedent to the expenditure of federal funds for the development of the Airport.

ARTICLE 25

CONCESSIONAIRE REPRESENTATIONS AND WARRANTIES; ADDITIONAL COVENANTS

25.1 Representations and Warranties. Concessionaire represents and warrants as follows, each of which is true and correct, as of the date of execution of this Agreement and shall be true through the term of this Agreement:

(a) Concessionaire has the power and authorization to enter into this Agreement, the Board of Directors of Concessionaire has by appropriate action approved this Agreement, this Agreement has been executed and delivered pursuant to the authorization conferred by such action, and is binding upon Concessionaire in accordance with its terms, and that the individual(s) executing this Agreement on behalf of Concessionaire is duly authorized to do so.

(b) Concessionaire is duly authorized to do business in the State of California and possesses all governmental approvals necessary to perform this Agreement.

(c) Concessionaire is in compliance with all laws related to Concessionaire's business and activities conducted at the Airport.

(d) Except as disclosed in writing to the Authority before execution of this Agreement, there are no actions, suits, or proceedings pending with service of process

accomplished or, to Concessionaire's best knowledge, threatened in writing against or affecting Concessionaire, by or before any court, arbitrator, or government entity that (i) would adversely affect Concessionaire's ability to perform its obligations under this Agreement, or (ii) relate to the execution, delivery or performance by Concessionaire of this Agreement.

(e) Concessionaire's execution, delivery, and performance of this Agreement do not conflict with or and would not result in a violation of, or breach of, or constitute a default under, any agreement or instrument to which Concessionaire is a party or by which it is bound.

25.2 Additional Covenants. Throughout the term of this Agreement:

(a) Concessionaire shall comply with the Federal Requirements and applicable laws as to Concessionaire's operations and transactions related to the subject matter of this Agreement.

(b) Concessionaire shall comply with orders, directives, or conditions issued, given or imposed by the Authority with respect to Concessionaire's activities at the Airport.

(c) If the TSA, the FAA, or any other federal government entity imposes a fine or penalty on the Authority for Concessionaire's or a Concessionaire Agent's non-compliance with federal laws or rules and regulations, then Concessionaire shall reimburse and indemnify the Authority for the entire amount of the fine or penalty.

(d) Concessionaire shall possess and shall, at its sole expense, keep in effect, all licenses, permits, qualifications, and approvals of whatever nature legally required for Concessionaire to perform this Agreement.

(e) Concessionaire shall comply with all applicable prevailing wage laws (including Labor Code Sections 1720, 1720.2, 1720.3, 1720.4 and 1771) with respect to work performed in connection with this Agreement. Concessionaire shall be solely responsible for determining applicability of prevailing wage laws.

(f) Concessionaire shall not enter into, any contract that will create a conflict of interest with its obligations to perform this Agreement.

(g) At the Authority's request any time, Concessionaire shall provide a sworn affidavit listing all natural or artificial persons with an ownership interest in Concessionaire and stating that no other person holds an ownership interest in Concessionaire via a counter letter. For the purposes of this provision, an "ownership interest" shall not be deemed to include ownership of stock in a publicly traded corporation or ownership of an interest in a mutual fund or trust that holds an interest in a publicly traded corporation.

ARTICLE 26

GENERAL PROVISIONS

26.1 Notices. Any notices, invoices, or other documents related to this Agreement shall be delivered as provided in this Section and shall be deemed received on: (a) the day of delivery, if delivered by hand during regular business hours or by e-mail before or during regular business

hours; (b) the business day after delivery, if delivered by e-mail after regular business hours; or (c) on the second business day following deposit in the United States mail, postage prepaid, to the addresses listed below or to such other addresses as the parties may, from time to time, designate in writing. Any notice delivered by e-mail that concerns breach or termination of this Agreement shall concurrently be sent by deposit in the United States mail, postage prepaid but such notice shall be deemed received on the day of email delivery:

To Authority: BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY

before RPT Opening Date:

2627 N. Hollywood Way
Burbank, CA 91505

after RPT Opening Date:

2827 N. Hollywood Way
Burbank, CA 91505

Attn: John T. Hatanaka, Executive Director

Email: jhatanaka@bur.org

To Concessionaire: BaumTech, LLC
6565 St. Claude Ave.
Arabi, LA 70032

Attn: Richard Baumpy

Email: rbaumpy@baumygroup.com

26.2 Airport Rules and Regulations. Concessionaire and all Concessionaire Agents shall comply with the Airport Rules and Regulations. Violations of the Airport Rules and Regulations by Concessionaire or Concessionaire Agents shall be punishable as stated in the Airport Rules and Regulations including by administrative fines.

26.3 Security.

(a) Concessionaire shall be solely responsible for instituting and carrying out specific security measures for its properties at the Airport. The Authority shall be responsible only for general security throughout the Airport and shall not be liable for any vandalism that may occur in the areas of Concessionaire operation.

(b) The Authority may install, operate, and maintain a security monitoring system on the Airport that affects the areas where Concessionaire operates. The Authority may install, operate and maintain a computer-controlled access system at certain door access points.

(c) Concessionaire shall utilize the access control equipment provided by the Authority, after Concessionaire pays reasonable fees or charges for use of such access control equipment, or as otherwise agreed upon by the Authority in writing.

26.4 Generally Accepted Accounting Principles. Whenever any report or disclosure referred to in this Agreement consists, either in whole or in part, of financial information, such report or disclosure shall be prepared in accordance with generally accepted accounting principles.

26.5 No Waiver of Responsibility.

(a) The Authority's receipt, review, inspection or approval of Concessionaire's plans, work or materials, or reports shall not constitute a waiver or release by the Authority of any obligation or responsibility of Concessionaire, or an assumption of any risk or liability by the Authority. Concessionaire shall make no claim against the Authority on account of such receipt, review, inspection or approval.

(b) No payment by Concessionaire or receipt by the Authority of a lesser amount than the Concession Fee, fees or charges due to be made by Concessionaire shall be deemed to be other than on account of the Concession Fee, fees and/or charges due, and no endorsement or statement on any check or in any letter accompanying any check or payment as Concession Fee, fees or charges shall be deemed an accord and satisfaction, and Authority may accept such check or payment without prejudice to Authority's right to recover the balance of such Concession Fee, fees and/or charges or to pursue any other remedy provided in this Agreement,

26.6 Force Majeure. If either party shall be delayed or hindered in or prevented from the performance of any act required under this Agreement by reason of strikes, lockouts, labor disputes, inability to procure labor or materials, failure of power, restrictive governmental laws or regulations, riots, insurrection, terrorism, war, fire or other casualty, or other reason of a similar nature beyond the reasonable control of the party delayed in performing work or doing acts required under this Agreement, performance of such act shall be excused for the period of the actual delay attributable to such causes, and the period for the performance of any such act shall be extended for a period equivalent to the period of such delay. This section shall not be applicable to Concessionaire's obligations to procure insurance or to pay Concession Fee, fees and charges, or any other sums, moneys, costs, charges, or expenses required to be paid by Concessionaire. If any provision of this Agreement negates or limits the period of any extension for force majeure delay, such provision shall override this section. The party claiming excuse from performance for force majeure shall, within two days after the initial occurrence of the force majeure event, give the other party notice of such claim.

26.7 Time is of the Essence. Time is of the essence of this Agreement.

26.8 Authority Executive Director. In cases where the Authority's approval or consent is required pursuant to this Agreement, the Executive Director is authorized to give such approval or consent on behalf of the Authority. Without additional Authority Commission action, the Executive Director is also authorized to execute amendments to, and implementing operating memoranda for, this Agreement that do not have a negative financial impact on the Authority.

26.9 Relationship of Parties.

(a) This Agreement is not intended to create, and shall not be construed as creating, the relationship of principal and agent, partners, joint venturers, or any other similar such relationship between the Authority and Concessionaire. No provision in this Agreement and no act of the Authority or Concessionaire shall be construed to create a landlord and tenant relationship (as this Agreement solely confers a revocable license to the ATM Locations and Ancillary Locations).

(b) Concessionaire is and shall remain an independent contractor with respect to all installations, construction, and services performed under this Agreement. Concessionaire has full and exclusive liability for the payment of any and all contributions or taxes for social security; unemployment insurance, or old age retirement benefits pensions or annuities now or hereafter imposed under any law that are measured by the wages, salaries, or other remuneration paid to persons employed by Concessionaire on work performed under this Agreement.

(c) This Agreement is intended for the sole protection and benefit of the parties and their successors, and assigns. No other person shall have any right of action based this Agreement.

26.10 Joint and Several Liability. If Concessionaire is a limited liability company, partnership, or joint venture or is an entity comprised of more than one party or entity, the obligation imposed on Concessionaire under this Agreement shall be joint and several, and each member, general partner, joint venture partner, party, or entity of Concessionaire shall be jointly and severally liable for all obligations.

26.11 Effect of Debarment of Concessionaire. The Authority may immediately terminate this Agreement in the event Concessionaire is debarred from contracting or providing services by the Authority, the federal government, or by any other California governmental entity.

26.12 Labor Disputes. Concessionaire shall use commercially reasonable efforts to avoid disruption to the Authority, its tenants or members of the public arising from labor disputes involving Concessionaire.

26.13 Litigation. This Agreement shall be construed, interpreted and applied in accordance with, governed by, and enforced under the laws of the State of California. In the event that either party shall commence legal action to enforce or interpret this Agreement, the prevailing party shall be entitled to recover its costs of suit including reasonable attorneys' fees. The venue for litigation shall be Los Angeles County, California. The interpretation of this Agreement shall not be resolved by any rules of construction providing for interpretation against the party who causes the uncertainty to exist or against the party who drafted the disputed language. If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remainder shall remain in full force and effect, and shall in no way be affected, impaired, or invalidated.

26.14 Rules of Construction.

(a) General. Unless otherwise indicated or apparent from the context, the following rules of construction shall apply. The singular includes the plural and vice versa. The term "shall" is mandatory and the term "may" is permissive. The term "day" means calendar day.

The term “business day” means a non-holiday weekday. The phrase “regular business hours” means 8:00 AM to 5:00 PM California time. The phrase “for [number] days” means for [number] consecutive days. The phrase “at any time” means at any time and from time to time; and the terms “include,” “includes,” and “including” are illustrative and nonexhaustive. Words importing persons shall include firms, associations, partnerships, trusts, corporations and other legal entities, including public bodies, as well as natural persons.

(b) Cross-References. Cross-references are to articles, sections, or paragraphs of this Agreement unless otherwise indicated or apparent from the context.

(c) Law References. References to a statutory code or legislative bill refer to California law unless otherwise indicated or apparent from the context. References to a statute, regulation, or ordinance shall be deemed to refer to the then-current version of the statute, regulation, or ordinance.

(d) Fair Meaning. The language of this Agreement shall be construed according to its fair meaning, and not strictly for or against either party.

(e) Two Constructions. If any provision in this Agreement is capable of two constructions, one of which would render the provision void and the other of which would render the provision valid, then the provision shall have the meaning which renders it valid.

26.15 Exhibits.

(a) Exhibits A through D are incorporated into this Agreement by reference. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of Exhibits A through C, the provisions of this Agreement shall prevail. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of Exhibit D, the provisions of Exhibit D shall prevail.

(b) Whenever information in an exhibit becomes outdated because of changes pursuant to this Agreement, a change in law or Airport policy changes otherwise approved by the Authority Commission, the parties may make a substitution to update the exhibit. Such substitution shall not require Authority Commission approval.

26.16 Incorporation of Mandatory Language. Each and every provision required by law to be inserted in this Agreement shall be deemed to be inserted and this Agreement shall be read and enforced as though such provision were included. If through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon request of either party this Agreement shall promptly be amended to make such insertion or correction.

26.17 Integration. This Agreement (and the attached Exhibits) represents the entire and integrated contract between the parties regarding Concessionaire’s concession in the Airport Terminal. This Agreement supersedes all prior oral or written negotiations, representations and contracts related to such subject matter. This Agreement may not be amended, nor any provision or breach waived, except in a writing that is signed by the parties and that expressly refers to this Agreement.

ARTICLE 27 SIGNATURES

27.1 Electronic Signature and Delivery. A manually signed copy of this Agreement and any other document(s) attached to this Agreement delivered by facsimile, e-mail or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this Agreement. No legally binding obligation shall be created with respect to a party until such party has delivered or caused to be delivered a manually signed copy of this Agreement.

27.2 Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original and all of which shall be taken together and deemed to be one instrument.

27.3 Parent Company. If financial statements for a parent company were submitted with the Proposal, the parent company shall also execute the Agreement such that it is bound jointly with Concessionaire to the obligations of the Agreement.

[SIGNATURES ON FOLLOWING PAGE]

TO EXECUTE THIS AGREEMENT, the parties have caused their authorized representatives to sign below.

BaumTech, LLC

By:  _____

Print Name: Richard Baomy

Title: Manager

By: _____

Print Name: _____

Title: Manager

[Pursuant to California Corporations Code Section 17703.01(d), both signature lines must be executed unless the articles of incorporation state that the firm is managed by only one manager.]

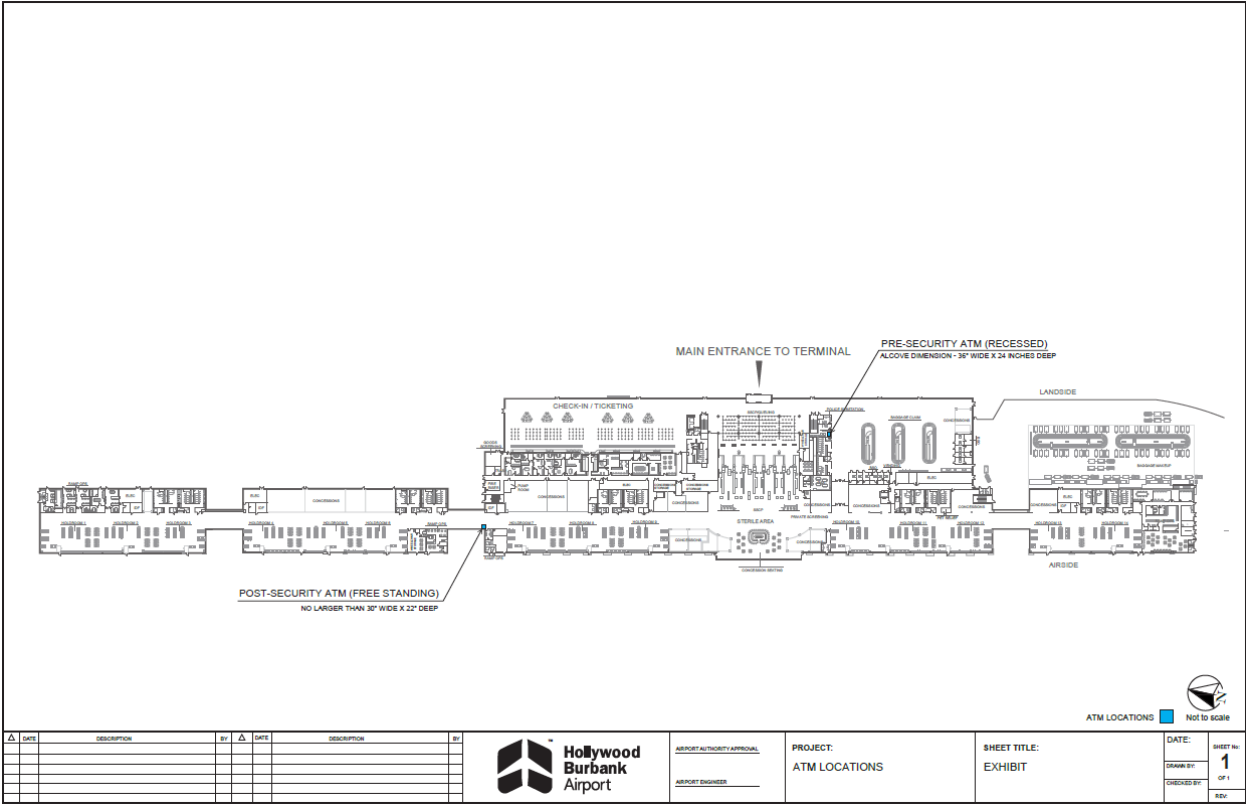
Burbank-Glendale-Pasadena Airport Authority

Jess A. Talamantes, President

Approved as to form:

Richards, Watson & Gershon
A Professional Corporation

Exhibit A: ATM Installations and Locations & Ancillary Installation and Locations



Δ	DATE	DESCRIPTION	BY	Δ	DATE	DESCRIPTION	BY



APPROVED FOR PROJECT APPROVAL

APPROVED BY _____

APPROVED BY _____

PROJECT:

ATM LOCATIONS

SHEET TITLE:

EXHIBIT

DATE:

SHEET NO:

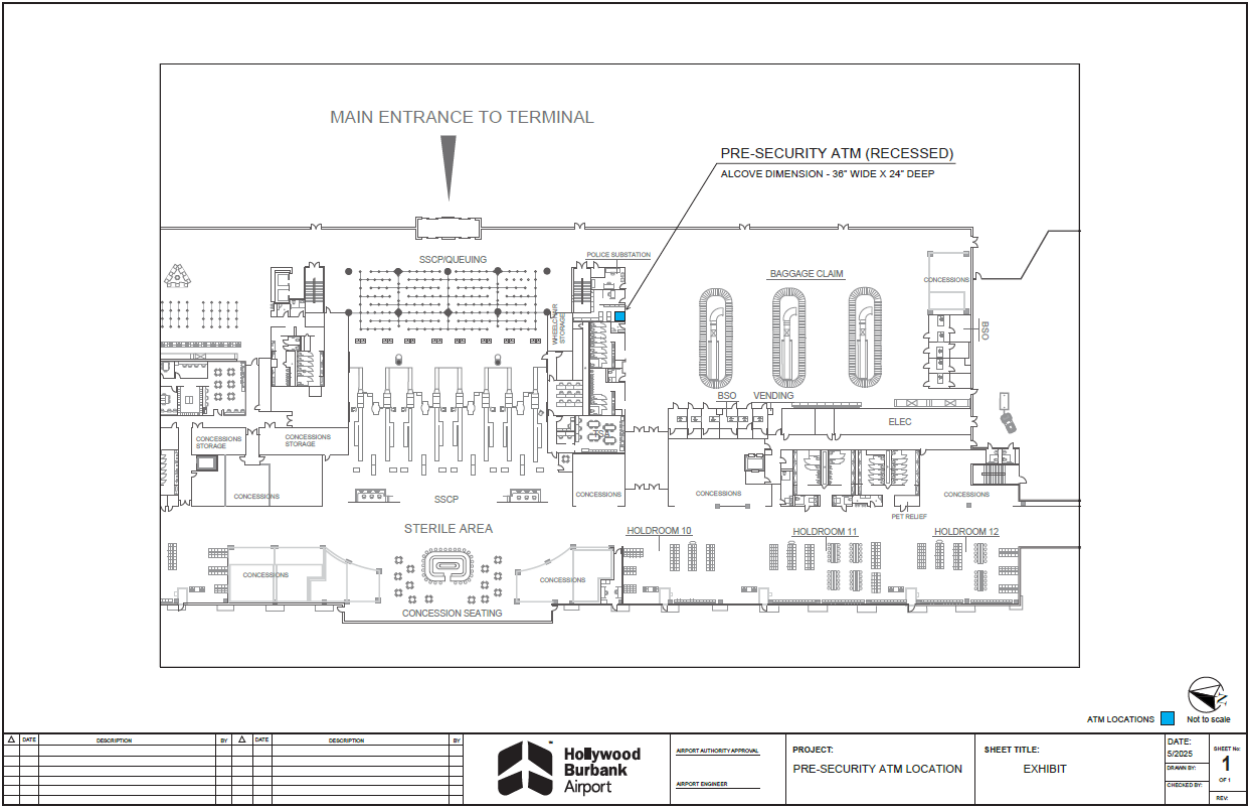
1

OF 1

CREATED BY:

REV:

Pre-Security ATM



Post-Security ATM

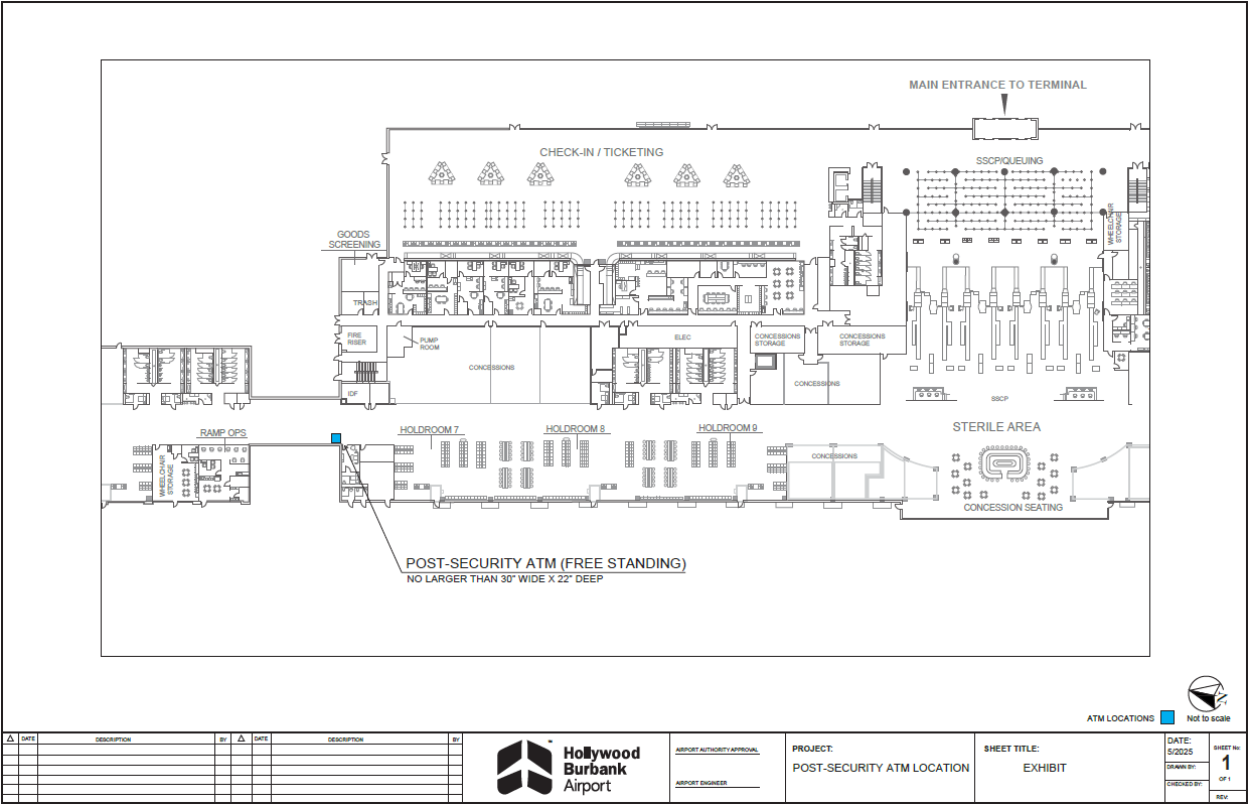


Exhibit B: Request for Proposal



RELEASE DATE: JANUARY 8, 2026

REQUEST FOR PROPOSALS ("RFP")

The Burbank-Glendale-Pasadena Airport Authority is soliciting competitive proposals from qualified respondents to contract for:

**AUTOMATED TELLER MACHINE ("ATM") CONCESSION
HOLLYWOOD BURBANK AIRPORT
RFP NO. ADM26-03**



Hollywood Burbank
Airport

Q&A DEADLINE: ALL QUESTIONS/REQUESTS FOR INTERPRETATION MUST BE RECEIVED BY JANUARY 22, 2026, AT 4:00 P.M. VIA PLANETBIDS.

PROPOSALS DUE: FEBRUARY 6, 2026, AT 5:00 P.M. VIA PLANETBIDS

PROPOSALS MUST REMAIN VALID FOR 120 DAYS FROM DUE DATE.

REQUEST FOR PROPSALS (“RFP”)

AUTOMATED TELLER MACHINE (“ATM”) CONCESSION HOLLYWOOD BURBANK AIRPORT RFP NO. ADM26-03

By submitting a proposal, Respondent acknowledges receipt of all content of the RFP package as delivered electronically and hereby attests to non-collusion regarding the competitive opportunity and any price submitted. Respondent acknowledges and accepts the terms of this solicitation, including any addenda, which will become part of any resultant agreement, and agrees that the terms as listed will supersede any conflicting contractual terms and/or conditions specified elsewhere. Respondent certifies that the information provided in its submission is complete, including the full disclosure of all sub-contractors, suppliers, joint-ventures, teaming agreements and the like, and that the information submitted is true and accurate to the best of its personal knowledge. Respondent confirms that the signing party is an authorized representative of the entity submitting the proposal and has the individual authority to submit this proposal electronically on behalf of the entity and to bind the entity to all information set forth herein.

Date: _____	Company Name: _____	
*Authorized Signature	Name	Title
*Authorized Signature	Name	Title

*If the contracting party is a corporation, two (2) signatures are required: one (1) signature by either the Chairperson of the Board, the President or any Vice President; and one (1) signature by either the Secretary, any Assistant Secretary, the Chief Financial Officer or any Assistant Treasurer. The signature of one person alone is sufficient to bind a corporation, as long as he or she holds corporate offices in each of the two categories described above. In the alternative, a single corporate signature is acceptable when accompanied by a corporate resolution demonstrating the legal authority of the signatory to bind the corporation.

**RETURN THIS COVER PAGE WITH YOUR PROPOSAL – LATE, EMAILED, MAILED,
HAND DELIVERED, OR FAXED SUBMISSIONS WILL NOT BE ACCEPTED.**

REQUEST FOR PROPOSALS (“RFP”)

**AUTOMATED TELLER MACHINE (“ATM”) CONCESSION
HOLLYWOOD BURBANK AIRPORT
RFP NO. ADM26-03**



**Hollywood Burbank
Airport**

The Burbank-Glendale-Pasadena Airport Authority (“Authority”), owner and operator of the Bob Hope Airport (commonly known as Hollywood Burbank Airport) (“BUR”), is soliciting proposals from experienced and qualified firms to install, operate, maintain and manage two Automated Teller Machines (“ATM”) at the Replacement Passenger Terminal (“RPT”).

GENERAL BACKGROUND INFORMATION

BUR is a medium-sized hub airport, located approximately 12 miles north of Downtown Los Angeles, serving the greater Los Angeles metropolitan area. BUR is the closest airport to the majority of popular tourist destinations in LA, including points of interest in Pasadena and the San Fernando Valley. In 2024, BUR served 6.5 million passengers. BUR currently offers 30 nonstop services from ten commercial airlines: Southwest, Alaska, United, American, Delta, Frontier, Spirit, JetBlue, Allegiant and Breeze. BUR also has two on-site, fixed-base operators, Hollywood Burbank Jet Center and Atlantic Aviation. It features a passenger terminal with 14 gates.

The Authority is a joint powers agency formed by the Cities of Burbank, Glendale, and Pasadena. The Authority is governed by a nine-member Commission, composed of three appointees from each of these cities.

REPLACEMENT PASSENGER TERMINAL

On December 19, 2022, the Authority awarded a contract to Holder, Pankow, TEC - A Joint Venture (“DB Contractor”) for the design and construction of a 355,000 square-foot RPT. The selected Respondent (“Concessionaire”) will be required to work with the Authority and the DB Contractor to install ATM equipment in connection with the RPT. The Concessionaire will be responsible for ensuring that the ATMs are installed and operational on or before August 14, 2026, which is 60 days prior to the anticipated opening of the RPT. The RPT is in the design/construction process. Information regarding the status of the ongoing development of the RPT Project may be found here: <http://elevatebur.com>.

OBJECTIVE

The Authority’s objective is to obtain an ATM service provider to install, operate, and manage two ATMs at the RPT in the following locations: one ATM will be located Pre-Security in the Baggage Claim area and one ATM will be located Post-Security by Holdroom 7 as depicted in Exhibit B – ATM Locations and Ancillary Locations.

SCOPE OF SERVICES

The Concessionaire shall provide the Authority with a comprehensive and complete solution as detailed in Exhibit A – Scope of Services.

PROCUREMENT SCHEDULE

The anticipated schedule for this competitive selection process is listed below. The schedule is subject to change at the sole discretion of the Authority. Please check the PlanetBids website for the latest schedule.

Procurement Phase Schedule	Date
RFP Issued by Authority	January 8, 2026
Deadline for Submission of written questions or requests for clarification	January 22, 2026
Proposals Due	February 6, 2026
Notice of Intent to Award	March 2026
Award Recommendation to Authority Finance Committee	April 6, 2026
Award Recommendation to Authority Commission	April 20, 2026
Service Commencement Date (60 days prior to Opening RPT)	August 14, 2026

QUESTIONS/REQUESTS FOR CLARIFICATIONS

No interpretation or clarification regarding this RFP will be made verbally to any firm. Any inquiries or requests for clarification concerning this procurement must be in writing and submitted through the Authority's e-procurement website portal, PlanetBids, via the Q&A tab. Any substantive replies will be issued as a written addendum and posted on PlanetBids. No questions or requests for clarifications will be accepted after 4:00 p.m. on January 22, 2026.

In accordance with Authority Commission Resolution No. 492, all communications during the procurement process shall be to the exclusive attention of Francisco Flores, through the PlanetBids portal and violation of this prohibition shall be grounds for disqualification from consideration for the contract award. Questions posted via any other method will not be considered. Questions received after the deadline will not be addressed.

When submitting a request for interpretation via the Q&A tab, Respondents are encouraged to reference the RFP or Exhibit page and section pertinent to the question(s). Respondents shall not rely upon any oral instructions given by the Authority.

PROPOSAL CONTENT

Respondents are required to follow the format and assemble their proposal as specified below. The content of the proposal must be clear, concise, and complete. The proposal shall be of text not smaller than 11 pt. font size and submitted in .pdf format and shall not be password protected. The proposal may not exceed 30 pages. The page count does not include the cover letter, cover page, the sample certificate of insurance, the table of contents, resumes, the sample agreement acknowledgment statement, nor section dividers.

Proposals not submitted in the manner described herein may be rejected as non-responsive. Each section of the proposal shall be organized and correlated with the following sections:

1. Cover Letter and Executive Summary – Not-to-exceed two pages and shall include:

- a. Respondent's contact information – provide the name, title, telephone, and email of the contact responsible for communication with the Authority regarding Respondent's proposal.
- b. Legal name and physical business street address for headquarter offices, as well as the physical street address of servicing office, if not the same address as Respondent's headquarters office.
- c. Present a summary case for why Respondent would best serve as the Authority's ATM service provider. Respondent may include in this section any additional material it deems relevant or appropriate.
- d. Name, title and signature of person(s) authorized to legally bind the entity submitting the proposal.
- e. Potential Conflicts: Provide a brief statement as to whether Respondent and/or its team have any potential conflicts that may arise in the performance of the services requested in this RFP.

2. Qualifications and Experience

Respondent shall submit a detailed statement of its qualifications and background in providing ATM services at an airport as defined by the Federal Aviation Administration ("FAA") or at a public government facility. Statement shall include the following:

- a. Number of years in business under the business name set forth in the proposal and current number of employees.
- b. A brief description of the organization's history, capabilities, resources, structure, ownership, size and services provided.
- c. A comprehensive overview of the company's experience in successfully financing, managing, operating and maintaining ATM services at an Airport of similar size or at a public government facility.
- d. A demonstration of Respondent's significant, in-depth knowledge, past performance and experience relating to the services required, as outlined in Exhibit A - Scope of Services.

3. References

Respondent shall demonstrate a minimum of five years of continuous experience within the last eight years in the operation and management of an ATM concession at an airport of similar size or at a public government facility.

Respondent shall provide a list of two references which demonstrate verifiable experience, specifically:

- a. References must be from airports or public government facilities where Respondent provided such services within the last five years. Do not provide less or more than two references.
- b. Specify the performance period for each of the references' contracts. Provide contact information for each of the references, including the name of agency/company, street address, contact name, title/position, email address, and phone number from each reference company/agency who can confirm Respondent's experience. The preferred point of contact is a representative who provided direct oversight and/or supervision of the contracted services.

The Authority's inability to reach a reference because of inaccurate contact information shall be cause for the proposal to be rejected as non-responsive.

4. Organization and Key Personnel Assigned to Oversee ATM Contract

Respondent shall provide an organization chart showing:

- a. All names, titles, contact information and brief background of the anticipated individuals who will be assigned to the contract.
- b. Role each individual will play in the provision of the contract.
- c. Escalation contact matrix.
- d. On-call Service Manager.

5. Proposed Management Plan and Approach

Describe the services and activities that your company proposes to provide to the Authority.

Include the following information:

- a. Describe the proposed approach to satisfy the services and requirements as described in Exhibit A - Scope of Services. Include information on the overall service tasks to demonstrate your understanding of the Authority's ATM service needs and assignment of work within Respondent's work team.
- b. Describe any other asset, expertise, experience, data or technology that provides your firm with a competitive edge or advantage. If you believe that your approach to providing the services described is different or more effective than other firms providing the same services, describe those differences in methodology, staff roles and responsibilities, and documentation processes as applicable.

6. Design, Installation and Implementation

Respondent shall provide information that clearly identifies the design, make, model and

specifications of the proposed ATM and ensures that it complies with the specifications listed in Exhibit B and C.

Respondent shall provide all implementation and logistic plans to ensure that the ATMs are installed and fully operational on or before August 14, 2026. Respondent shall ensure that the requirements set forth in Section 2 and 3 of Exhibit A – Scope of Services are incorporated in the timeline.

7. Proposed Financial Offer and Sample Monthly Reporting Form

Respondent shall submit a proposed per Transaction Fee (no less than \$2.50 per transaction per ATM) payable to the Authority.

Respondent shall submit a proposed Surcharge Fee (no more than \$5.00 per transaction per ATM).

Respondent shall provide a sample Monthly Reporting Form containing, but not limited to the following information for each ATM location:

- a) All transaction types
- b) Date of transaction
- c) Amount dispensed
- d) Surcharge fees collected on a daily basis
- e) Number of transactions on a daily basis
- f) Total number of transactions on a monthly basis
- g) Total amount due to the Authority

8. Concession Agreement Acknowledgement Statement

A sample Automated Teller Machine Concession Agreement (“CA”) is set forth as Exhibit D. **Respondent must include in its proposal a sample agreement acknowledgment statement indicating either: (i) Respondent will execute the sample agreement as presented; or (ii) Respondent objects to language in the sample agreement. If Respondent objects to any language contained in the sample agreement, then Respondent must identify the contested contract language and shall submit alternate contract language for consideration.** Proposals that do not expressly declare such a statement related to their acceptance of the sample agreement, and that do not identify contested contract language and include alternative contract language, shall be deemed non-responsive. The Authority reserves the right to alter the sample agreement after selection of a firm with notice to the proposed awardee.

9. Insurance

Respondent shall provide a sample certificate of insurance which accurately represents and verifies that the required insurance coverage will be met. The requirements are listed in Article 18 of CA.

SELECTION CRITERIA

Proposals will be evaluated/scored using the following Selection Criteria and based on the information contained in a complete proposal:

Evaluation Criteria	Max Score
SC-1 Experience, Background, and Past Performance	10
SC-2 Organization and Key Personnel Assigned to Oversee ATM Concession	10
SC-3 Proposed Management Plan and Approach	20
SC-4 Proposed Design, Implementation, and Installation Plan	20
SC-4 Financial Offer and Sample Monthly Reporting Form	40
Selection Criteria Total	100

SC-1 Respondent's Experience, Background, Qualification and Past Performance

- 1) Respondent has provided documentation confirming that the Respondent has been in the business of providing ATM services at an airport of similar size or public government facility for a minimum of five years within the last eight years.
- 2) Respondent has provided documentation of its organization's history, structure, size, resources and capabilities of providing ATM services.
- 3) Respondent has provided documentation and demonstrated its capability and credentials to successfully perform all tasks as described in Exhibit A – Scope of Services.
- 4) Respondent has provided a minimum of two references, which are from either airports or other government agencies where Respondent acted as the responsible entity for providing ATM services. Such services include the design, installation, implementation and management of the ATMs.

SC-2 Organization and Key Personnel Assigned to Oversee ATM Contract

- 1) Respondent has provided an organization chart outlining and identifying the project team's personnel along with their professional background and qualifications.
- 2) Respondent has provided an escalation contact matrix.

SC-3 Proposed Management Plan and Approach

- 1) Respondent has demonstrated an adequate strategic plan to achieve the desired scope of services as described in Exhibit A and Exhibit D.
- 2) Respondent has provided a complete overview of the tasks involved to satisfy the Authority's

ATM service needs and how work will be assigned within the Respondent's team.

SC-4 Proposed Design, Implementation and Installation Plan

- 1) Respondent has demonstrated a clear implementation plan with deadlines that meet the RPT's construction and opening schedule.
- 2) Respondent has provided information pertaining to the make, model and size of the ATMs.
- 3) Respondent has demonstrated that the ATMs meet the requirements set forth in Exhibit C.
- 4) Respondent has provided a timeline that ensures that the ATMs will be fully functional and operational on or before August 14, 2026.

SC-5 Financial Offer and Sample Monthly Reporting Form

- 1) Respondent has offered a competitive per Transaction Fee (no less than \$ 2.50 per transaction per ATM) payable to the Authority.
- 2) Respondent has provided a sample monthly Reporting Form that it proposes to submit to the Authority in accordance with Article 5.5 and Article 7 of the CA.

The Authority may contact recent clients and references for information and verification of experience and past performance, and Respondent expressly consents, releases from all liability, and holds the Authority harmless in all regards, with respect to the Authority making such contacts. The Authority may obtain background information from other sources, such as Dunn and Bradstreet.

TITLE VI SOLICITATION NOTICE

The Authority, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§2000d to 2000d-4) and the Regulations, hereby notifies all firms that it will affirmatively ensure that for any contract entered into pursuant to this RFP, disadvantaged business enterprises will be afforded full and fair opportunity to submit responses to this RFP and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

CONTRACT AWARD/PERFORMANCE TERM

It is anticipated that the Authority shall award a CA to one Respondent for a five-year performance term, with two, one year extension options, exercisable at the sole discretion of the Authority's Executive Director or designated designee. The award, if made by the Authority Commission, will be to the Respondent offering the proposal deemed to provide the best value to the Authority, with price and other factors listed in the Selection Criteria considered. The Authority Commission will consider, but is not bound by, the recommendations of the evaluation panel and the Finance and Administration Committee. An award by the Authority Commission shall be based on the majority consensus Selection Criteria ranking and adoption of a formal scoring sheet is not required.

PUBLIC RECORD

By submitting a proposal, each Respondent understands and agrees that the Authority is subject

to the California Public Records Act, which provides that proposals submitted to public agencies are disclosable public records once a contract award has been agendized for consideration at a public meeting. Proposals shall not contain trade secrets.

OTHER SOLICITATION TERMS

The Authority reserves the right to negotiate and may request clarifications on all associated items as part of its evaluation prior to contract award. The Authority reserves the right to evaluate the qualifications of any Respondent, based on experience and past performance, technical ability, suitable and appropriate credentials, and the overall capability of the company to perform the required scope as it deems in its best interest. The Authority reserves the right to cancel this RFP process, or to reject any and all proposals, for any reason at its sole discretion, at any time prior to contract award, and/or to waive any informalities or technical defects as the interests of the Authority may require. Respondents shall bear their own proposal preparation costs. Proposals shall be valid for acceptance by the Authority for 120 days from the proposal due date. Debrief requests will not be entertained but a final evaluation score sheet broken down by selection criteria category will be made public. This solicitation is not a commitment to contract, nor a promise or an authorization to purchase required resources, nor does it require commencement of any order or project.

REQUIRED DOCUMENTS

All proposals must include complete information as required in Proposal Contents, Sections 1 - 9 to be considered for evaluation.

Failure to submit information in accordance with the RFP requirements shall be cause for rejection of the proposal.

ADDENDA AND NOTICES

It shall be the Respondent's responsibility to check the PlanetBids website to obtain any addenda that may be issued and to receive any information/notices for this project.

PROPOSAL SUBMISSION

Proposals shall be submitted electronically to the Authority by uploading to the PlanetBids website (<https://www.planetbids.com/portal/portal.cfm?CompanyID=21910>) by 5:00 p.m. on February 6, 2026. Late, emailed, faxed, or hand delivered submissions will not be accepted.

Proposals shall be addressed to:

Burbank-Glendale-Pasadena Airport Authority
Attention: Francisco Flores, Sr. Procurement Specialist
Ref: RFP ADM26-03 ATM Concession
2627 N. Hollywood Way
Burbank, CA 91505
Phone: 818.333.6056
E-mail: fflores@bur.org

Select "Place e-Bid" to enter bid information. All information is visible only to the Respondent. Data may be "saved" (preliminary) or "submitted" (final), revised and withdrawn up to the closing deadline.

Respondent will receive a confirmation after final “submitting” of an e-bid. Proposals must be successfully and completely uploaded and e-bid confirmation received by submitting party prior to deadline. Therefore, plan response time accordingly. Respondents are cautioned to completely check their proposal for accuracy prior to submission. The Authority strongly recommends that each Respondent research the “Place E-bid” tab prior to submission in order to understand how the components of the response (i.e., proposal) are to be uploaded in the General Attachments and Response File tabs.

Please contact PlanetBids directly at 818-992-1771 for technical assistance with your submission, as the Authority does not have access to the Vendor Portal.

RFP Exhibits (all are incorporated by reference herein):

- Exhibit A: Scope of Services
- Exhibit B: ATM Locations and Ancillary Locations
- Exhibit C: ATM Specifications and Features
- Exhibit D: Sample Automated Teller Machine Concession Agreement

Exhibit C: Concessionaire's Proposal in Response To RFP

2026



Request for Proposal (RFP)

**AUTOMATED TELLER MACHINE ("ATM") CONCESSION HOLLYWOOD BURBANK
AIRPORT RFP NO. ADM26-03**



Presented by:

BaumTech, LLC
6565 St. Claude Ave.
Arabi, LA 70032

RFP NO. ADM26-03

Table of Contents

COVER PAGE..... 2

COVER LETTER..... 3

EXECUTIVE SUMMARY 4

QUALIFICATIONS AND EXPERIENCE 4

 WHY CHOOSE US 4

 AIRPORT EXPERIENCE 5

 OBJECTIVES..... 5

REFERENCES 5

 NEW ORLEANS INTERNATIONAL AIRPORT..... 5

 SAN DIEGO REGIONAL AIRPORT..... 5

ORGANIZATION AND KEY PERSONNEL..... 6

 ORGANIZATION CHART 6

 KEY PERSONNEL..... 6

 ESCALATION CONTACT MATRIX 7

PROPOSED MANAGEMENT PLAN AND APPROACH..... 8

 UNIQUE ATTRIBUTES THAT DIFFERENTIATE BAUMTECH’S SERVICES 8

 MAINTENANCE PLAN..... 8

 TECHNICAL SUPPORT..... 8

 PROGRAM AND PROCEDURES 9

 PART AND EQUIPMENT REPLACEMENTS 9

DESIGN, INSTALLATION AND IMPLEMENTATION 9

 ATM SERVICE AVAILABILITY 9

 BANKING NETWORKS..... 10

 NUMBER AND TYPE OF CARDS ACCEPTED..... 10

 ESTIMATED TIMELINE AND STRUCTURE 10

ATM SPECIFICATIONS..... 12

 PROPOSED ATM LOCATIONS..... 12

 EQUIPMENT SPECS FOR GENMEGA ONYX 12

PROPOSED FINANCIAL OFFER AND SAMPLE MONTHLY REPORTING FORM 13

 PROPOSED FINANCIAL OFFER..... 13

 SAMPLE MONTHLY REPORTING FORM 13

CONCESSION AGREEMENT ACKNOWLEDGEMENT STATEMENT 14

ADDENDUM AND EXHIBIT ACKNOWLEDGEMENT STATEMENT 14

CERTIFICATE OF INSURANCE 15

RFP NO. ADM26-03

Cover Page

REQUEST FOR PROPSALS ("RFP")

AUTOMATED TELLER MACHINE ("ATM") CONCESSION
HOLLYWOOD BURBANK AIRPORT
RFP NO. ADM26-03

By submitting a proposal, Respondent acknowledges receipt of all content of the RFP package as delivered electronically and hereby attests to non-collusion regarding the competitive opportunity and any price submitted. Respondent acknowledges and accepts the terms of this solicitation, including any addenda, which will become part of any resultant agreement, and agrees that the terms as listed will supersede any conflicting contractual terms and/or conditions specified elsewhere. Respondent certifies that the information provided in its submission is complete, including the full disclosure of all sub-contractors, suppliers, joint-ventures, teaming agreements and the like, and that the information submitted is true and accurate to the best of its personal knowledge. Respondent confirms that the signing party is an authorized representative of the entity submitting the proposal and has the individual authority to submit this proposal electronically on behalf of the entity and to bind the entity to all information set forth herein.

Date: 2/5/2026	Company Name: BaumTech, LLC	
Signed by: Richard Bauny	Richard Bauny	CEO
*Authorized Signature	Name	Title
	Name	Title

*If the contracting party is a corporation, two (2) signatures are required: one (1) signature by either the Chairperson of the Board, the President or any Vice President; and one (1) signature by either the Secretary, any Assistant Secretary, the Chief Financial Officer or any Assistant Treasurer. The signature of one person alone is sufficient to bind a corporation, as long as he or she holds corporate offices in each of the two categories described above. In the alternative, a single corporate signature is acceptable when accompanied by a corporate resolution demonstrating the legal authority of the signatory to bind the corporation.

RETURN THIS COVER PAGE WITH YOUR PROPOSAL – LATE, EMAILED, MAILED,
HAND DELIVERED, OR FAXED SUBMISSIONS WILL NOT BE ACCEPTED.

REQUEST FOR PROPOSALS ("RFP")

RFP ADM26-03 AUTOMATED TELLER MACHINE CONCESSION
Page | 2

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RFP NO. ADM26-03

Cover Letter



BaumTech, LLC
Richard Baumy
rbaumy@baumtechatm.com
504-578-0156
6565 St. Claude Ave.
Arabi, LA 73002

Emergency Number: 888-314-ATMS
Support Email:
service@baumtechatm.com

Burbank-Glendale-Pasadena Airport Authority
Attention: Francisco Flores, Sr. Procurement Specialist
Ref: RFP ADM26-03 ATM Concession
2627 N. Hollywood Way
Burbank, CA 91505
Phone: 818.333.6056
E-mail: fflores@bur.org

Dear Mr. Francisco Flores,

BaumTech, LLC is excited about the opportunity to submit information regarding the Request for Proposal for Installation, Operation, Maintenance, and Management of ATM Services at Bob Hope Airport (BUR). We are delighted to contribute to the services provided to residents and visitors of California.

Our comprehensive response and all requested material, including all relevant paperwork, are included in the accompanying proposal. And at such time BaumTech, and its team members do not have any potential conflicts that would arise in the performance of the services requested in this RFP.

We look forward to establishing a long-term, mutually beneficial relationship with Bob Hope Airport and the Burbank-Glendale-Pasadena Airport Authority. If you require any additional information or have any queries about our qualifications, please contact me personally by phone or email.

Thank you for your consideration.

Richard Baumy

DocuSigned by:


Chief Executive Officer
rbaumy@baumtechatm.com
504-578-0156

RFP NO. ADM26-03

Executive Summary

BaumTech, LLC has been in business since 2008. We started servicing airports' needs in 2019 with the addition of 8 ATMs for the New Orleans Airport. Since, we have expanded across the country, providing ATM and Reverse ATM (Cash to Card Kiosks) services. We have extensive expertise working with airports and high-profile transit clients. We operate ATMs at, as mentioned previously, the New Orleans International Airport, San Diego Regional Airport, Reno Tahoe International Airport, Jacksonville International Airport, Pensacola Airport, Phoenix Gateway Airport, McAllen Airport, Rapid City Airport, and the Nashville Mass Transit Authority.

BaumTech operates a network of more than 700 ATMs in 37 states including corporate clients such as Hilton, Marriott, TPG, HRI, and many more. We also operate in hospitals including, MD Anderson Cancer Center in Houston, and more throughout the New Orleans and Louisiana area. We also provide services to government building such as convention centers, entertainment centers, and city halls as well as banks and credit unions.

We will provide Bob Hope Airport with unparalleled ATM service and uptime.

Qualifications and Experience**Why Choose Us**

BaumTech was founded in 2008 and coming up on our 18th year in business. BaumTech started with 1 employee and is now operating with nine employees and many more contractors and associates. BaumTech is uniquely positioned to be your preferred vendor for ATM solutions, backed by 18 years in business and over 60 years of combined experience in the ATM industry. Our clients trust us with providing the best experience to their customers, guests, and travellers. Over the years BaumTech has amassed a large network of ATM technicians, vault cash suppliers, and other servicers throughout the 37 states we currently operate. On our ATM fleet across the country, we provide service, repair, and maintenance, 24/7 monitoring and vault cash services.

We bring extensive expertise in federally regulated environments, including significant experience in transportation and high-profile venues like airports. We have more than five years of expertise working in federally regulated environments and are well-versed in TSA badging standards and procedures. BaumTech has also worked in ground transportation centers for over five years. Prior to that, our primary focus was hospitality and healthcare, which we still have a significant presence.

By choosing BaumTech, you'll benefit from competitive revenue splits, dedicated 24/7 support, and a partner that truly goes the extra mile to guarantee your satisfaction.

We look forward to delivering top-notch services that ensure smooth operations for your organization.

RFP NO. ADM26-03

Airport Experience

Airport	# of ATMs	Contract Term	2024 Passengers
New Orleans International Airport	8	Nov 2019 – Oct 2026	~13.2 million
Jacksonville International Airport	3	Apr 2022 – Apr 2026	~7.6 million
San Diego International Airport	15	Sep 2021 – Aug 2026	~24.2 million
Phoenix–Mesa Gateway Airport	2	Dec 2023 – Nov 2026	~1.9 million
Reno–Tahoe International Airport	5	Sep 2022 – Aug 2027	~4.9 million

Objectives

To align with the Airport's objectives, our company, BaumTech, is the perfect fit. We take great pride in providing exceptional service to our customers and end-users, ensuring a 99% uptime on our ATMs.

BaumTech’s experience partnering with Financial Institutions at other major airports to brand ATMs has proven highly successful. This not only enhances trust in our ATMs but also elevates the image of the airport itself. By choosing BaumTech as your ATM concession partner, the Airport can be assured of meeting its objectives of providing top-notch service and enhancing its public image.

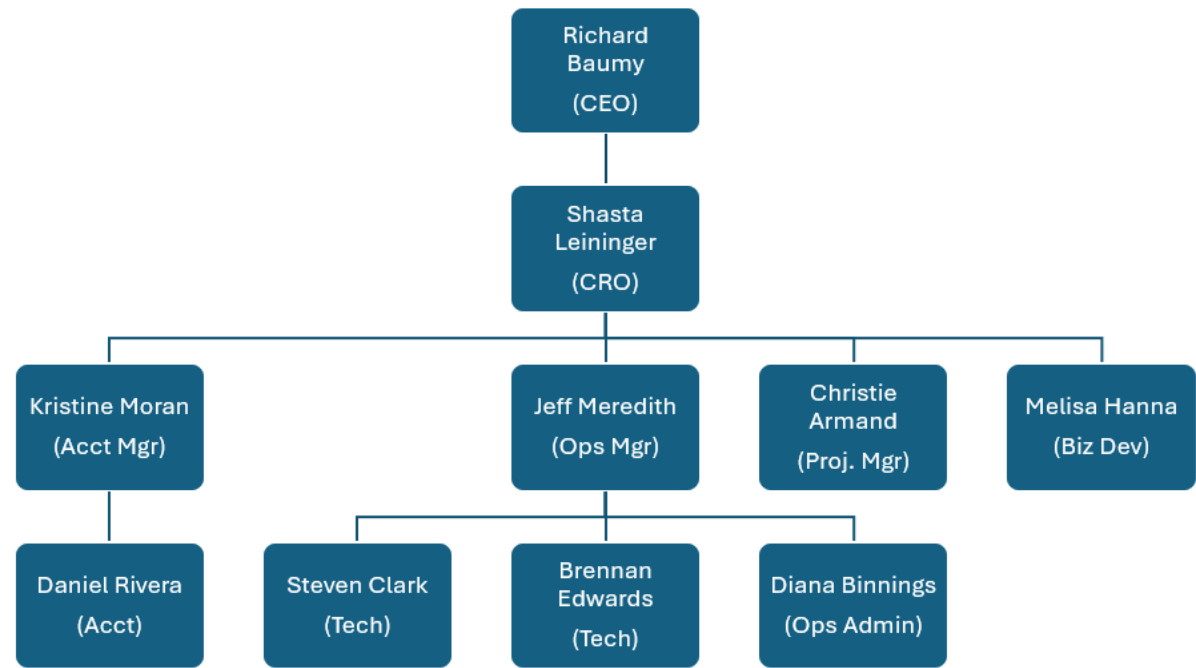
References

Airport	Address	Contact Information	
		Name	
New Orleans International Airport	900 Airline Dr. Kenner, LA 70062	Jasmine James	
		Title	Concessions Supervisor
		Phone	504.389.0645
		Email	jazminej@flymsy.com
San Diego Regional Airport	3225 N. Harbor Dr. San Diego, CA 92101	Mario Donato	
		Title	Associate Asset Manager
		Phone	619.400.2236
		Email	mdonato@san.org

RFP NO. ADM26-03

Organization and Key Personnel

Organization Chart



Key Personnel

Richard Baomy Chief Executive Officer/Owner 504.578.0156 rbaomy@baumygroup.com	Richard will oversee the contract and make sure all items are being accounted for and service levels meet the needs of the Authority.
Jeffrey Meredith Operations Manger 504.293.7437 jmeredith@baumygroup.com	After installation Jeff will monitor and maintain the equipment, resolving hardware or software failures.
Christie Armand Project Manager 504.294.4275 carmand@baumygroup.com	Christie will be assigned as your project manager. She will be in contact with the appropriate team members to coordinate everything from shipping to installation
Shasta Leininger Chief Revenue Officer 504.946.9844 sleininger@baumygroup.com	Shasta will be your main point of contact for this contract. She will be available to answer any questions, comments or concerns the Authority may have.
Kristine Moran Accounting Manager 504.946.7078 kmoran@baumygroup.com	Kristine will be your contact for any billing concerns, including setting up ACH and statements.

RFP NO. ADM26-03

Escalation Contact Matrix

Primary Service Contact (Level 1 – First Response)

Service Number: 504-224-9183

Availability: 24/7 (Direct line monitored at all times)

Responsibility:

- First-level troubleshooting
- Resolves the majority of issues
- Determines if escalation is required

This is the required first point of contact for all service issues.

Secondary Escalation (Level 2 – Management Review)

Contact: Jeff Meredith

Phone: 504-293-7437

When Used:

- Issue not resolved at Level 1
- Requires higher-level troubleshooting
- Authority requests elevated support

Jeff determines the technical or operational next steps if Level 1 cannot resolve the issue.

Critical Escalation (Level 3 – Executive Support)

Contact: Shasta Leininger

Phone: 504-946-9844

When Used:

- Critical system outage
- Emergency situation
- Significant operational impact

Shasta is available for urgent matters requiring executive-level intervention.

Level 4 – Owner Escalation (Final Step)

Contact: Richard Baumpy

When Used:

- Critical issue remains unresolved
 - Major contractual or operational impact
 - Executive-level resolution required
-

Escalation Flow

1. Call 504-224-9183 (24/7 Service Line)
2. If unresolved → Escalate to Jeff Meredith
3. If critical → Contact Shasta Leininger
4. Unresolved Critical Issue → Contact Richard Baumpy

Throughout this process the On-call Service Manager will be Jeffrey Meredith.

RFP NO. ADM26-03

Proposed Management Plan and Approach**Unique attributes that differentiate BaumTech's Services**

1. BaumTech ATM's ability to leverage our real-time, two-way Remote Monitoring Software to immediately reduce error conditions to maximize uptime and assist clients who need to phone in.
2. Utilization of our Cash Loading Forecast software to carefully control and orchestrate cash loads. Cash loading is performed when the cash reserves hit a predetermined level, instead of on a predetermined day, which prevents downtime. When the predetermined level is reached our team dispatches our local provider, who will be there within two hours.
3. Cellular communication in which BaumTech is not required to connect to a local network. On a VPN, the cellular connection is encrypted, giving the highest level of cyber security.
4. The GenMega ATMs will come equipped with the new EMV card reader that supports EMV Chip technology and meets all smart card reader compliance requirements.
5. NFC is available readers come standard on our GenMega ATMs, providing for better security at the ATM and a more seamless transaction for you travellers.
6. Our ATMs have toppers that can display airport information if the Authority desires.
7. BaumTech only uses new ATMs for Airports. The machine and all parts are under warranty for 2 years.
8. BaumTech's experience partnering with Financial Institutions at other major airports to brand ATMs has proven highly successful. This not only enhances trust in our ATMs but also elevates the image of the airport itself. By choosing BaumTech as your ATM concession partner, the Airport can be assured of meeting its objectives of providing top-notch service and enhancing its public image.

Maintenance Plan

The Bob Hope Airport and its customers will be able to contact the BaumTech office 24 hours a day, seven days a week, with any queries or issues. BaumTech has held its ATMs and contracts to the highest standards, with a 99.9% uptime on all machines across the country. BaumTech uses a Remote Monitoring System with 2-way communication, which allows us to not only diagnose but also fix many issues remotely. Our office can install software updates and patches on the fly, saving hours of downtime every year.

After installation, our ATMs are typically replenished on a weekly or on an as needed basis. During each replenishment, our technicians perform preventative maintenance to make sure the machines are in working order, cleaned, and presentable for the public.

Our unique approach of storing all parts in our Arabi, LA warehouse and collaborating with local associates in the Burbank area for common parts allows us to consistently maintain this high level of service.

Technical Support

BaumTech offers a toll-free number (888-314-ATMS) for reporting technical problems. This line is answered 24 hours a day, seven days a week, and our technicians take action within hours.

The equipment is monitored 24 hours a day, seven days a week. Most ATM issues can be resolved remotely, whereas in-person service calls at the facility often take two (2) hours. We use response times to trouble tickets as a key performance indicator (KPI) and work rapidly to guarantee that our requirements are regularly measured and met.

RFP NO. ADM26-03

Program and Procedures

BaumTech monitors the ATMS 24/7 via three separate systems to ensure the ATMs are fully functional. eRMS (Remote Monitoring System) shows the real-time status of the ATM, cash balance, most recent transactions, and real-time errors. This program will send an immediate alert if the ATM encounters an issue, including but not limited to bill jams, component failures, or transaction failures. The wireless device portal reports the real-time signal strength of the modem and alerts us of any outages. The modems are equipped with dual signals, meaning if there is a Verizon outage the modem will switch to AT&T, and vice versa. The transaction processing software reports atm errors that include bill jams, component failures, and transaction failures as well as several transactional reports. These reports monitor for fluctuations in volume and frequency. Additionally, we perform weekly checks of our EMV Fallback data to ensure we are compliant with all debit card processing regulations. We perform daily, remote spot-checks of all ATMs to ensure they are one hundred percent operational. The local technicians also perform surface disinfecting and cleaning on each visit to load the machine. While most issues can be resolved remotely within minutes, our local technicians are trained and available to respond to issues and errors quickly to meet the needs of the airport.

Part and Equipment Replacements

We store every replacement part locally in our Arabi, LA warehouse and the more common parts are stored with our current local associates which operate in the Burbank area. This enables us to do same-day part replacements without waiting for parts to ship from the manufacturer. This cost is absorbed by BaumTech and not passed to you.

On a weekly basis ATMs will be cleaned and inspected for security concerns. This will happen with every ATM replenishment, which in some cases maybe multiple times per week. If an ATM malfunctions a number is provided on the ATM for the customer to call our office. Our staff will walk them through the process to resolve their issue and if the issue persists, we will direct them to another ATM. Our local technicians will then be dispatched same day to resolve the issue if it cannot be resolved remotely. In most cases, ATMs will be fixed the same day an issue is noticed. If there is a severe issue that cannot be resolved by on site technicians a spare ATM will be kept locally for next day swaps.

Design, Installation and Implementation

ATM Service Availability

1. Dynamic Currency Conversion allows users to convert foreign currency withdrawals at the processor rather than at their financial institution, helping them to save on conversion rates.
2. The ATM service supports withdrawals, cash advances on credit or debit cards, account inquiries, and transfers. All withdrawals are dispensed as US currency in increments/denominations of Twenty Dollars (\$20.00), with a maximum per withdrawal of Two Hundred Dollars (\$200.00). Other denominations such as \$10 will be considered upon Authorities request.
3. The GenMega ATMs support four languages on screen.
 - English
 - French
 - Spanish
 - Korean
5. ATM is NFC ready from when major card networks certify it for use in retail ATMs.
6. We allow free balance inquiries and transfers.
7. ATMs Branded with Financial Institutions (Pathward Bank is the default) to increase trust and usage.

RFP NO. ADM26-03

8. Wayfinding signage (if needed), the ATM has an integrated backlit topper with a static display of the term “ATM”.

Banking Networks

Through our sponsor bank, Pathward, and our processing switch FIS we’re able to reach all regional and national banking networks.

Number and Type of Cards Accepted

BaumTech’s supported card networks include those required in the scope and additional networks as follows: Visa, Plus, Pulse, Mastercard, Maestro, Cirrus, UnionPay, Accel, Discover, Star, Nyce, American Express, AFFN, Diners Club, N, Quest, Shazam, Culiance, and the Armed Forces Financial Network.

Estimated Timeline and Structure

Total Estimated Duration:

The entire transition, from ordering the machines to full installation, is expected to take approximately 7 to 11 Days. We can order the machines on the day the Intent to Award is issued. Lead time for new machines are typically 7 days. We would be able to have the machines prepped and ready to install by August 14, 2026

Phased Transition and Installation Plan

BaumTech LLC will implement a structured, phased transition to ensure uninterrupted ATM service throughout planning, procurement, and installation. At least one ATM will remain operational at all times.

Phase 1: Initial Assessment and Planning (7 Days)

Activities:

- Intent to Award Actions: Upon receipt of the Intent to Award, BaumTech will immediately order the ATMs, initiate site evaluations, and schedule coordination meetings with all required stakeholders.
- Coordination Meetings: BaumTech will meet with the Authority’s personnel which oversees this project to confirm installation locations and finalize the transition schedule. These meetings will include:
 - Review of existing ATM locations, if applicable.
 - Identification of any required upgrades or site-specific needs
 - Scheduling installations to minimize operational disruption
 - Establishment of contingency measures to ensure continuous service
- Site Evaluation: BaumTech will conduct on-site assessments to verify power, network connectivity, spatial requirements, and infrastructure readiness at each ATM location. Any required upgrades will be documented and incorporated into the installation plan.
- Final Installation Schedule: A detailed, phased installation schedule will be developed to limit overlap and reduce downtime.

Phase 2: Procurement and Delivery of Equipment (3 Days)

Activities:

- Procurement: BaumTech will procure all ATMs and associated hardware, including electrical and networking components.
- Inspection and Quality Control: Upon delivery, all equipment will be inspected to confirm compliance with specifications and operational readiness.

RFP NO. ADM26-03

- Logistics Coordination: BaumTech will coordinate delivery and staging with its local service partner to ensure all equipment is prepared for installation.
- Pre-Installation Testing: All ATMs will undergo functional testing prior to deployment to confirm system performance and connectivity.

Phase 3: Installation and Commissioning (1 Day)

Activities:

- ATM Installation: ATMs will be installed one at a time, including full electrical and network configuration. This approach ensures:
 - Minimal service interruption
 - Close coordination with the current Concessionaire
 - Same-day installation whenever possible following removal of existing machines
 - Continued operation of the existing ATM until the replacement unit is fully commissioned
- Testing and Commissioning: Each ATM will be tested immediately after installation to confirm full operational status. Any necessary adjustments will be completed on-site.
- Continuous Service Assurance:
 - Installations will be staggered to ensure at least one ATM remains operational
 - Temporary cash access solutions will be deployed if needed to bridge any service gaps
- Training and Handover: Upon completion, BaumTech will provide operational and troubleshooting training to designated personnel and submit the system for final Department review.

Ongoing ATM Availability Measures

- Phased Installation: Only one ATM will be installed at a time to prevent service outages.
- Contingency Planning: Temporary or supplemental solutions will be used during peak periods if required.
- Real-Time Coordination: BaumTech will work closely with the current Concessionaire throughout the transition, with immediate troubleshooting support available as needed.

Summary Timeline

- Phase 1 – Planning and Coordination: 7 days
- Phase 2 – Procurement and Delivery: 3 days
- Phase 3 – Installation and Commissioning: 1 day

Total Estimated Transition Duration: 7–11 days

BaumTech LLC is committed to a seamless and efficient transition, maintaining uninterrupted ATM services throughout the installation process. Through disciplined planning, phased execution, and close coordination with all stakeholders, BaumTech will ensure reliable cash access at all times. If you want this rewritten to align *exactly* with Hollywood Burbank Airport's tone (shorter, more formal, fewer assurances), say the word and I'll tighten it another notch.

RFP NO. ADM26-03

ATM Specifications

Proposed ATM Locations

2 GenMega Onyx with Topper

Equipment Specs for GenMega Onyx

Topper	Communication
Optional Video Topper	TCP/IP Ethernet - SSL
Card Reader	Cash Dispenser
EMV DIP Type card reader	2000 Note Removable Cassette (HCDU)
Printer	Integrated Illuminated Sign
56mm (2" standard) Graphics Capable with 3"	High Visibility LED Sign Attract Customers
CPU	Allowable Humidity
Cortex-A8 CPU (800MHz) DDR2 256MB SRAM memory 512MB Flash Memory Windows CE 6.0	In storage: 10% < RH < 90%, non-condensed While operating: 15% < RH < 85%, non-condensed
LCD Screen	PIN Entry Device
10.2 inch wide 32-bit color Backlit TFT LCD panel 1280x800 Resolution Customizable Screens	16-key alphanumeric keypad PCI Certified Triple-DES (TDES) compliant EPP
Mounting	Security
Four (4) one half inch by four to five inch in length wedge anchor or equivalent bolt	UL291 Business Hours Vault Dial or Electronic Lock Upgrade Kit, GENCAM Rev1, W/ Camera, C6000/G6000
Specifications	Power Requirements
Dimensions Height = 56.4" Width = 15.8" Depth = 22.3" Weight = 223 lbs. (Without cash dispenser) Clearance = 6" of free space required to the left of the ATM to allow the door to open	110/220 VAC $\pm$ 10%, 50/60 Hz, 145 Watts Temperature Requirements In storage: 32°F - 104°F (0°C ~ 49°C) While operating 45°F - 95°F (5°C ~ 35°C)
	ADA
	Voice Guidance Lighted Transaction Guidance Accessible Keypad Layout

Standard Mock



RFP NO. ADM26-03

Proposed Financial Offer and Sample Monthly Reporting Form

Proposed Financial Offer

Surcharge Fee	\$4.99		
Proposed Per Transaction Fee	\$2.77	Based on surcharge transactions	55.5% of surcharge

Sample Monthly Reporting Form



BAUMTECH

Hollywood Burbank Airport
2627 N Hollywood Way
Burbank, CA 91505

Monthly-Year
Terminal #:
Terminal #: T1D

Business Date:	Total Trxs	Surch Trxs	Bal Inq	Denied Trxs	Rev	WD	Surch	Commission:
12/01/2025	25	8	9	6	0 \$	1,060.00	\$39.92	\$ 22.16
12/02/2025	22	13	9	0	0 \$	1,800.00	\$64.87	\$ 36.01
12/03/2025	14	4	6	3	0 \$	460.00	\$19.96	\$ 11.08
12/04/2025	31	17	10	4	0 \$	2,180.00	\$84.83	\$ 47.09
12/05/2025	23	11	8	3	0 \$	1,640.00	\$54.89	\$ 30.47
12/06/2025	22	10	12	0	0 \$	1,260.00	\$49.90	\$ 27.70
12/07/2025	26	13	10	2	0 \$	1,820.00	\$64.87	\$ 36.01
12/08/2025	29	15	9	4	0 \$	2,080.00	\$74.85	\$ 41.55
12/09/2025	28	17	10	0	1 \$	2,200.00	\$84.83	\$ 47.09
12/10/2025	21	12	7	2	0 \$	1,920.00	\$59.88	\$ 33.24
12/11/2025	29	17	10	2	0 \$	1,800.00	\$84.83	\$ 47.09
12/12/2025	31	20	10	1	0 \$	2,240.00	\$99.80	\$ 55.40
12/13/2025	16	7	8	1	0 \$	800.00	\$34.93	\$ 19.39
12/14/2025	22	11	10	1	0 \$	1,400.00	\$54.89	\$ 30.47
12/15/2025	61	28	24	8	0 \$	4,280.00	\$139.72	\$ 77.56
12/16/2025	33	15	15	0	0 \$	2,360.00	\$74.85	\$ 41.55
12/17/2025	27	12	11	3	0 \$	1,900.00	\$59.88	\$ 33.24
12/18/2025	24	12	10	2	0 \$	1,560.00	\$59.88	\$ 33.24
12/19/2025	14	9	5	0	0 \$	1,620.00	\$44.91	\$ 24.93
12/20/2025	27	14	10	1	0 \$	2,020.00	\$69.86	\$ 38.78
12/21/2025	30	16	10	2	1 \$	2,080.00	\$79.84	\$ 44.32
12/22/2025	30	16	11	3	0 \$	2,520.00	\$79.84	\$ 44.32
12/23/2025	27	15	9	3	0 \$	2,480.00	\$74.85	\$ 41.55
12/24/2025	14	8	5	0	0 \$	1,060.00	\$39.92	\$ 22.16
12/25/2025	11	5	5	1	0 \$	460.00	\$24.96	\$ 13.85
12/26/2025	27	15	10	1	0 \$	1,940.00	\$74.85	\$ 41.55
12/27/2025	27	13	11	3	0 \$	1,660.00	\$64.87	\$ 36.01
12/28/2025	28	13	14	1	0 \$	1,620.00	\$64.87	\$ 36.01
12/29/2025	24	8	6	5	0 \$	1,740.00	\$39.92	\$ 22.16
12/30/2025	28	16	11	1	0 \$	2,280.00	\$79.84	\$ 44.32
12/31/2025	10	8	2	0	0 \$	940.00	\$39.92	\$ 22.16
Surcharge:	781	398	297	63	2 \$	55,180.00	\$ 1,986.02	\$ 1,102.46
Total:							\$	1,102.46

www.BaumTechATM.com

For billing or customer service please call 888-314-2867



6565 St. Claude Ave. Arabi, LA 70032

888-314-2867

RFP NO. ADM26-03

Concession Agreement Acknowledgement Statement

BaumTech, LLC acknowledges receipt and review of the Sample Automated Teller Machine Concession Agreement. BaumTech, LLC hereby confirms that it will execute the Concession Agreement as presented, without exception, subject only to approval by the Burbank-Glendale-Pasadena Airport Authority Commission and the execution of the final agreement by both parties.

Addendum and Exhibit Acknowledgement Statement

BaumTech, LLC acknowledges receipt and review of the following:

RFP ADM26-03 – ATM Concession
 Exhibit A – Scope of Services – ATM Concession
 Exhibit B – ATM Locations and Ancillary Locations
 Exhibit C – ATM Specifications and Features
 Addendum 1 – Responses to Written Questions
 Attachment 1 to Addendum 1- Transaction Report
 Sample Automated Teller Machine Concession Agreement

END OF ADDENDUM NO. 1

Acknowledgment is hereby made of receipt and incorporation of Addendum 1 into the referenced RFP and related proposal submission.

DocuSigned by:
 Signature: Richard Bauny Date: 2/5/2026
 27 Authorised Representative
 Name/Title: Richard Bauny CEO
 Firm Name: BaumTech, LLC

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RFP NO. ADM26-03

Certificate of Insurance



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
01/30/2026

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER AssuredPartners Gulf Coast Ins Agency LLC 3300 West Esplanade Avenue Suite 300 Metairie LA 70002		CONTACT NAME: Leanne Cannon PHONE (A/C, No, Ext): (504) 581-5353 FAX (A/C, No): (504) 588-2954 E-MAIL ADDRESS: leanne.cannon@assuredpartners.com															
INSURED BaumTech, LLC 6565 St. Claude Ave Arabi LA 70032		INSURER(S) AFFORDING COVERAGE <table border="1"> <tr> <th>INSURER</th> <th>NAIC #</th> </tr> <tr> <td>INSURER A: Western World</td> <td>13196</td> </tr> <tr> <td>INSURER B: GEICO Marine Insurance Company</td> <td>37923</td> </tr> <tr> <td>INSURER C: Evanston Insurance Company</td> <td>35378</td> </tr> <tr> <td>INSURER D: LUBA Casualty Ins Company</td> <td>12472</td> </tr> <tr> <td>INSURER E: Fortegra Specialty Insurance Company</td> <td>16823</td> </tr> <tr> <td>INSURER F:</td> <td></td> </tr> </table>		INSURER	NAIC #	INSURER A: Western World	13196	INSURER B: GEICO Marine Insurance Company	37923	INSURER C: Evanston Insurance Company	35378	INSURER D: LUBA Casualty Ins Company	12472	INSURER E: Fortegra Specialty Insurance Company	16823	INSURER F:	
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INSURER D: LUBA Casualty Ins Company	12472																
INSURER E: Fortegra Specialty Insurance Company	16823																
INSURER F:																	

COVERAGES CERTIFICATE NUMBER: CL25111353625

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR (NSD) (WVD)	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☒ POLICY ☐ PRO-JECT ☐ LOC OTHER:		NPP6211962	11/12/2025	11/12/2026	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ Included
B	☐ ANY AUTO ☐ OWNED ☒ AUTOS ONLY ☒ HIRED ☐ AUTOS ONLY ☒ SCHEDULED ☒ AUTOS ☒ NON-OWNED ☐ AUTOS ONLY		9300238353	11/12/2025	11/12/2026	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
C	☒ UMBRELLA LIAB ☒ EXCESS LIAB ☐ OCCUR ☐ CLAIMS-MADE DED \$ RETENTION \$		XOBW10503125	11/12/2025	11/12/2026	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000 \$
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/ MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N Y	027000301648125	10/07/2025	10/07/2026	☒ PER STATUTE ☐ OTHER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000 Limit \$2,000,000
E	Commercial Cyber and Privacy Liability - Claims Made Coverage Form		C-4LPX-248461-CYBER-2025	11/12/2025	11/12/2026	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
 General Liability includes additional insureds as required by written contract prior to a loss. Workers Compensation includes Waiver of subrogation as required by written contract prior to a loss.

CERTIFICATE HOLDER

CANCELLATION

	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE

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ACORD 25 (2016/03)

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Exhibit D: Federal Requirements

For purposes of this Exhibit, references to “Contractor” shall be deemed to refer to Concessionaire.

1. General Civil Rights Provisions

A. In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin (including limited English proficiency), creed, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

B. This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

C. If the Contractor transfers its obligation to another, the transferee is obligated in the same manner as the Contractor.

D. The above provision obligates the Contractor for the period during which the property is owned, used or possessed by the Contractor and the airport remains obligated to the Federal Aviation Administration.

2. Civil Rights – Title VI Assurance

A. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

1. Title VI of the Civil Rights Act of 1964 (42 USC § 2000d et seq., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);

2. 49 CFR part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);

3. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

4. Section 504 of the Rehabilitation Act of 1973 (29 USC § 794 et seq.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);

5. The Age Discrimination Act of 1975, as amended (42 USC § 6101 et seq.) (prohibits discrimination on the basis of age);

6. Airport and Airway Improvement Act of 1982 (49 USC § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);

7. The Civil Rights Restoration Act of 1987 (PL 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

8. Titles II and III of the Americans with Disabilities Act of 1990 (42 USC § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;

9. The Federal Aviation Administration’s Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

10. Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs [70 Fed. Reg. 74087 (2005)];

12. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC § 1681, et seq).

B. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”), agrees as follows:

1. Compliance with Regulations: The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. Nondiscrimination: The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), creed, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

3. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the contractor’s obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

4. Information and Reports: The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or

b. Cancelling, terminating, or suspending a contract, in whole or in part.

6. Incorporation of Provisions: The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

3. ACDBE Regulations

A. This agreement is subject to the requirements of the U.S. Department of Transportation's regulations, 49 CFR part 23. The concessionaire or contractor agrees that it will not discriminate against any business owner because of the owner's race, color, national origin, or sex in connection with the award or performance of any concession agreement, management contract, or subcontract, purchase or lease agreement, or other agreement covered by 49 CFR part 23.

B. The concessionaire or contractor agrees to include the above statements in any subsequent concession agreement or contract covered by 49 CFR part 23, that it enters and cause those businesses to similarly include the statements in further agreements.

PROFESSIONAL SERVICES AGREEMENT
(Burbank-Glendale-Pasadena Airport Authority / ADK Consulting, Inc.)

THIS PROFESSIONAL SERVICES AGREEMENT (“Agreement”) is dated May 4, 2026 for reference purposes and is executed by the Burbank-Glendale-Pasadena Airport Authority (“Authority”), a California joint powers agency, and ADK Consulting, Inc. (“Consultant”), a Florida corporation.

R E C I T A L S

A. The Authority owns and operates Hollywood Burbank Airport (“Airport”) and desires to retain Consultant as an independent contractor to provide the following professional services: executive search and consulting.

B. Consultant represents that it is fully qualified to perform such work by virtue of the training and experience of its personnel.

NOW, THEREFORE, the parties agree as follows:

1. Definitions. In addition to the terms defined above, the following definitions shall apply for purposes of this Agreement:

A. “Airport Rules and Regulations”: July 1, 2023 Airport Rules and Regulations or any successor adopted by the Authority Commission.

B. “Authority President”: Jess A. Talamantes.

C. “Contract Amount”: \$47,751 (exclusive of travel expense reimbursements).

D. “Federal Requirements” the federal requirements set forth in the attached Exhibit C, which requirements are applicable to projects not funded by an Airport Improvement Program grant from the Federal Aviation Administration.

E. “Fee Schedule”: the fee schedule set forth in the Proposal.

F. “Indemnitees”: the Authority, TBI Airport Management, Inc., the Cities of Burbank, Glendale and Pasadena, and the respective officers, agents, employees and volunteers of each such entity.

G. “Insurance Requirements”: the insurance requirements set forth in the attached Exhibit B.

H. “Liabilities”: any actual, alleged, or threatened causes of action, claims, costs, damages, demands, expenses (including fees of accountants, attorneys, and other professionals), judgments, liens, losses, penalties, and proceedings of any nature whatsoever.

I. “Proposal”: Consultant’s [REDACTED], 2026 proposal set forth in the attached Exhibit A.

J. “Services”: the tasks set forth in the Proposal.

2. Services.

A. Consultant shall perform the Services in a timely, regular basis in accordance with the Federal Requirements and applicable laws. Time is of the essence in the performance of this Agreement.

B. Consultant shall perform all work to professional standards and in a manner reasonably satisfactory to the Authority. Consultant shall consult the Authority Commission’s ad hoc committee or the Authority President, as applicable, for any decisions that must be made by the Authority.

C. Consultant’s duties and services under this Agreement shall not include preparing or assisting the Authority with any portion of the Authority’s preparation of a request for proposals, request for qualifications, or any other solicitation regarding a subsequent or additional contract with the Authority. The Authority shall at all times retain responsibility for public contracting, including with respect to any subsequent phase of this project. Consultant’s participation in the planning, discussions, or drawing of project plans or specifications shall be limited to conceptual, preliminary, or initial plans or specifications. Consultant shall cooperate with the Authority to ensure that all competitors for a subsequent contract on any subsequent phase of this project have access to the same information, including all conceptual, preliminary, or initial plans or specifications prepared by Consultant pursuant to this Agreement.

D. In the event any claim is brought against the Authority relating to Consultant’s performance of the Services, Consultant shall provide any reasonable assistance and cooperation that the Authority might require.

3. Term.

A. This Agreement shall commence upon execution and shall expire upon full performance by the parties unless earlier terminated.

B. If Consultant breaches this Agreement and fails to cure such breach within seven days of written notice from the Contract Administrator, then the Authority may immediately terminate this Agreement for cause. Either party may terminate this Agreement for convenience upon 15 days prior written notice to the other party.

4. Compensation.

A. The Authority shall compensate Consultant for performance of the Services, and Consultant agrees to accept as full satisfaction for such work, payment according to the Fee Schedule. Additionally, the Authority shall reimburse Consultant at cost for pre-approved travel

expenses. In no event shall the compensation payable to Consultant under this Agreement exceed the Contract Amount (exclusive of travel expense reimbursements).

B. Consultant shall submit invoices to the Authority for the Services as specified in the Proposal. Each invoice shall itemize the work performed during the billing period and the amount due. Within 10 business days of receipt of each invoice, the Authority shall notify Consultant in writing of any disputed amounts on the invoice. Within 30 calendar days of receipt of each invoice, the Authority shall pay all undisputed amounts on the invoice. The Authority shall not withhold applicable taxes or other authorized deductions from the payments, and Consultant shall pay all required taxes on the payments.

5. Independent Contractor Status. Consultant is, and shall at all times remain as to the Authority, an independent contractor. Consultant shall have no power to incur any debt, obligation, or liability on behalf of the Authority or to act otherwise on behalf of the Authority as an agent. Neither the Authority nor any of its officers, employees, agents or volunteers shall have control over the conduct of Consultant except as set forth in this Agreement.

6. Airport Rules and Regulations. Consultant shall comply with the Airport Rules and Regulations. Consultant acknowledges that the Airport Rules and Regulations are available on the Authority's webpage (hollywoodburbankairport.com). Violations of the Airport Rules and Regulations by Consultant or its personnel shall be punishable as stated in the Airport Rules and Regulations including by administrative fines.

7. Work Product Ownership. All reports, documents, or other written material developed by Consultant in the performance of this Agreement shall be and remain the property of the Authority without limitation upon use or dissemination by the Authority.

8. Confidentiality. Consultant shall preserve the confidentiality of all nonpublic data, documents, discussion or other information that is developed or received by it in connection with this Agreement. Consultant shall not disclose such information without the prior written authorization of the Authority. Upon request, all Authority data shall be returned to the Authority at expiration or termination of this Agreement. Consultant's obligations under this section shall survive expiration or termination of this Agreement.

9. Conflict of Interest. Consultant shall not maintain or acquire any financial interest that may be affected by the Services. Consultant shall avoid the appearance of having any financial interest that would conflict in any manner with the Services.

10. Indemnification.

A. Consultant shall defend, hold harmless, and indemnify the Indemnitees from and against any Liabilities that arise out of the acts or omissions of Consultant or its subcontractors in connection with this Agreement.

B. Consultant's obligations under this section shall survive expiration or termination of this Agreement, and shall apply regardless of whether or not any insurance policies are determined to be applicable to the Liabilities.

C. Consultant's obligations under this section shall apply, without limitation, to Liabilities that partially involve active or passive negligence by the Authority. However, Consultant's obligations under this section shall not apply to Liabilities that arise from the sole negligence or willful misconduct of the Authority, as determined by final arbitration or court decision or by consensus of the parties.

11. Insurance. Without limiting Consultant's defense, hold harmless, and indemnification obligations under this Agreement, Consultant shall maintain policies of insurance as specified in the Insurance Requirements.

12. Suspension. The Authority President may suspend all or any part of the Services for the Authority's convenience or for work stoppages beyond the control of the parties. Written notice of a suspension shall be given to Consultant.

13. Notices. Any notices, invoices, or other documents related to this Agreement shall be deemed received on: (a) the day of delivery, if delivered by hand during regular business hours or by e-mail before or during regular business hours; (b) the business day after delivery, if delivered by e-mail after regular business hours; or (c) on the second business day following deposit in the United States mail, postage prepaid, to the addresses listed below, or to such other addresses as the parties may, from time to time, designate in writing. Any notice delivered by e-mail that concerns breach or termination of this Agreement shall concurrently be sent by deposit in the United States mail, postage prepaid but such notice shall be deemed received on the day of e-mail delivery.

Authority
Burbank-Glendale-Pasadena Airport Authority
2627 Hollywood Way
Burbank, CA 91505
Attn: John T. Hatanaka
E-mail: jhatanaka@bur.org

Consultant
ADK Consulting, Inc.
P.O. Box 330906
Atlantic Beach, FL 32233
Attn: Douglas Kuelpman
E-mail: doug@adkexecutivesearch.com

14. Assignability. Consultant shall not assign, transfer or subcontract any interest in this Agreement or the performance of any of its obligations without the Executive Director's prior written consent. Any attempt by Consultant to assign, transfer or subcontract any rights, duties or obligations in violation of this prohibition shall be void.

15. Rules of Construction. Unless otherwise indicated or apparent from the context, the following rules of construction shall apply. The singular includes the plural and vice versa; the term "shall" is mandatory and the term "may" is permissive; the term "business day" means a non-holiday weekday; the term "regular business hours" means the period from 8:00 a.m. PST to 5:00 p.m. PST on a business day; and the terms "include," "includes," and "including" are illustrative and nonexhaustive.

16. Examination and Audit. Pursuant to Government Code Section 8546.7, the parties are subject to the examination and audit of the California State Auditor, at the Authority's request or as part of any audit of the Authority, for a period of three years after final payment under this Agreement.

17. Litigation. In the event that either party shall commence legal action to enforce or interpret this Agreement, the venue for litigation shall be Los Angeles County, California. The interpretation of this Agreement shall not be resolved by any rules of construction providing for interpretation against the party who causes the uncertainty to exist or against the party who drafted the disputed language.

18. Exhibits. Exhibits A through C are incorporated into this Agreement by reference. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of Exhibits A or B, the provisions of this Agreement shall prevail. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of Exhibit C, the provisions of Exhibit C shall prevail.

19. Incorporation of Mandatory Language. Each and every provision required by law to be inserted in this Agreement shall be deemed to be inserted and this Agreement shall be read and enforced as though such provision were included. If any such provision is not inserted, or is not correctly inserted, then upon request of either party this Agreement shall promptly be amended to make such insertion or correction.

20. Entire Agreement. This Agreement (and the attached Exhibits) represents the entire and integrated contract between the parties regarding the Services. This Agreement supersedes all prior oral or written negotiations, representations and contracts related to the Services. This Agreement may not be amended, nor any provision or breach waived, except in a writing that is signed by the parties and that expressly refers to this Agreement.

[SIGNATURES ON FOLLOWING PAGE]

TO EXECUTE THIS AGREEMENT, the parties have caused their authorized representatives to sign below.

ADK Consulting, Inc.

By: Douglas R. Kuelpman

Print Name: Douglas R. Kuelpman

☐ Chairperson ☒ President ☐ Vice President

By: Annex S. Kuelpman

Print Name: Annex S. Kuelpman

☒ Secretary ☐ Asst. Secretary
☐ Chief Finance Officer ☐ Asst. Treasurer

[Pursuant to Corporations Code Section 313, both signature lines must be executed unless the signatory holds at least one of the offices designated on each line.]

Burbank-Glendale-Pasadena Airport Authority

Jess A. Talamantes, President

Approved as to form:

Richards, Watson & Gershon
A Professional Corporation

EXHIBIT A
Proposal

(attached)

EXHIBIT B

Insurance Requirements

1. Consultant shall obtain, provide, and maintain policies of insurance as specified below.

A. General Liability Insurance. Consultant shall maintain commercial general liability insurance in an amount not less than \$1,000,000 per occurrence, \$2,000,000 general aggregate, for bodily injury, personal injury, and property damage.

B. Automobile Liability Insurance. Consultant shall maintain automobile insurance covering bodily injury and property damage for all activities of Consultant arising out of or in connection with the Services, including coverage for any owned, hired, non-owned or rented vehicles, in an amount not less than \$1,000,000 combined single limit for each accident.

C. Professional Liability (Errors and Omissions) Insurance. Consultant shall maintain professional liability insurance that covers the Services in the minimum amount of \$1,000,000 per claim and in the aggregate. Any policy inception date, continuity date, or retroactive date must be before execution of this Agreement and Consultant shall maintain continuous coverage through a period of no less than three years after expiration or termination of this Agreement.

D. Workers' Compensation/Employer's Liability Insurance. Consultant shall maintain workers' compensation insurance (statutory limits) and employer's liability insurance with limits of at least \$1,000,000.

2. The insurance policy or policies shall contain, or shall be endorsed to contain, the following provisions:

A. General liability policies shall provide or be endorsed to provide: (i) that the Indemnitees shall be additional insureds; and (ii) a waiver of subrogation in favor of additional insureds. This provision shall also apply to any excess/umbrella liability policies.

B. A severability of interests provision must apply for all additional insureds ensuring that Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the insurer's limits of liability. The policy(ies) shall not contain any cross-liability exclusions.

C. The coverage shall contain no special limitations on the scope of protection afforded to the Indemnitees.

D. For any claims related to this Agreement, Consultant's insurance coverage shall be primary insurance as respects the Indemnitees. Any insurance or self-insurance maintained by the Indemnitees shall be excess of Consultant's insurance and shall not contribute with it.

E. The limits of insurance may be satisfied by a combination of primary and umbrella or excess insurance. Any umbrella or excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of each Indemnatee before the Indemnatee's own insurance or self-insurance shall be called upon to protect it as a named insured.

F. Any failure to comply with reporting or other provisions of the policy, including breaches of warranties, shall not affect coverage provided to the Indemnitees.

G. Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

H. The policy shall be endorsed to state that coverage shall not be suspended, voided, cancelled by either party, or reduced in coverage or in limits except after 30 calendar days (10 calendar days in the event of non-payment of premium) prior written notice by certified mail, return receipt requested, has been given to the Authority.

I. Insurance is to be placed with insurers authorized to conduct business in the State of California with a minimum current A.M. Best's rating of no less than A:X, unless waived by the Authority President. An exception to this standard will be made for the State Compensation Insurance Fund when not specifically rated.

J. Any deductibles or self-insured retentions must be declared to and approved by the Authority President. At the option of the Authority President, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Indemnitees, or Consultant shall provide a financial guarantee satisfactory to the Authority President guaranteeing payment of losses and related investigations, claim administration and defense expenses.

K. The workers' compensation insurer agrees to waive all rights of subrogation against the Authority for injuries to employees of Consultant resulting from work for the Authority or use of the Airport.

3. Requirements of specific coverage features or limits are not intended as a limitation on coverage, limits, or other requirements, or as a waiver of any coverage normally provided by any insurance. Specific reference to a given coverage feature is for clarification purposes only as it pertains to a given issue and is not intended by any party or insured to be all inclusive, or to the exclusion of other coverage, or a waiver of any type. If Consultant maintains higher limits than the minimum specified above, the Authority requires and shall be entitled to coverage for the higher limits maintained by Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Authority.

4. Consultant shall furnish to the Authority an original certificate or certificates of insurance and amendatory endorsements showing that required policies are in effect in the required amounts and, as to the workers' compensation insurance, with the required waiver of

subrogation. The certificates and endorsements must be received and approved by the Authority President prior to commencement of work. The Authority reserves the right to require complete, certified copies of all required insurance policies at any time.

5. Consultant shall ensure that its subcontractors provide the same minimum insurance coverage and endorsements required of Consultant. Consultant shall monitor and review all such coverage, and Consultant assumes all responsibility for ensuring that such coverage is provided. Upon request, Consultant shall submit all subcontractor agreements to the Authority for review.

6. In the event any policy of insurance does not comply with these requirements or is cancelled and not replaced, the Authority has the right but not the duty to obtain the insurance it deems necessary. Any premium paid by the Authority in such event shall be promptly reimbursed by Consultant or the Authority shall withhold from its payments to Consultant an amount sufficient to pay that premium.

7. The Authority reserves the right at any time to change the amounts and types of required insurance by giving Consultant 90 days notice of such change. If such change results in substantial additional cost to Consultant, then the parties shall renegotiate Consultant's compensation.

EXHIBIT C

Non-AIP Project Federal Requirements

References in this Exhibit to “Contractor” shall be deemed to refer to Consultant. References in this Exhibit to “Sponsor” shall be deemed to refer to the Authority. Consultant shall: (i) insert these provisions in each lower tier contract; (ii) incorporate the requirements of these provisions by reference for work done under any purchase orders, rental agreements, and other agreements for supplies or services; and (iii) be responsible for compliance with these provisions by any subcontractor, lower-tier subcontractor, or service provider.

1. General Civil Rights Provisions

A. In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin, creed, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

B. This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

C. The above provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract.

2. Civil Rights – Title VI Assurance

A. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

1. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);

2. 49 CFR part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964) including amendments thereto;

3. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

4. Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 et seq.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);

5. The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 et seq.) (prohibits discrimination on the basis of age);

6. Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);

7. The Civil Rights Restoration Act of 1987 (P.L. 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

8. Titles II and III of the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;

9. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. § 1681, et seq).

B. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”), agrees as follows:

1. Compliance with Regulations: The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. Nondiscrimination: The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin, creed, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21 including amendments thereto.

3. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor’s obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

4. Information and Reports: The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or

b. Cancelling, terminating, or suspending a contract, in whole or in part.

6. Incorporation of Provisions: The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

ON-CALL PAVEMENT IMPROVEMENT AGREEMENT

(Burbank-Glendale-Pasadena Airport Authority / Griffith Company)

THIS ON-CALL PAVEMENT IMPROVEMENT AGREEMENT ("Agreement") is dated May 4, 2026 for reference purposes and is executed by the Burbank-Glendale-Pasadena Airport Authority ("Authority"), a California joint powers agency, and Griffith Company ("Contractor"), a California Corporation. Contractor's CSLB license number is 88. Contractor's DIR registration number is 1000005611.

1.1 RECITALS

A. The Authority owns and operates Hollywood Burbank Airport ("Airport") and desires to retain Contractor as an independent contractor to provide on-call pavement improvement services.

B. Contractor represents that it is fully qualified to perform such work by virtue of the training and experience of its personnel.

NOW, THEREFORE, the parties agree as follows:

1.2 DEFINITIONS

In addition to the terms defined above, the following definitions shall apply for purposes of this Agreement:

- A. "ADR": Airport Designated Representative.
- B. "Airport Rules and Regulations": July 1, 2023 Airport Rules and Regulations or any successor adopted by the Authority Commission.
- C. "Bid": Contractor's bid submitted in response to the RFB.
- D. "Commencement Date": May 4, 2026.
- E. "Contract Documents": this Agreement, the RFB, Bid, Specifications, General Provisions, Special Provisions, and Federal Provisions.
- F. "Contract Limit": \$2,500,000.
- G. "DIR": California Department of Industrial Relations.
- H. "Executive Director": John T. Hatanaka or a duly authorized designee.
- I. "Expiration Date": May 3, 2027 unless extended as provided below.

- J. "Federal Requirements" the federal requirements set forth in the attached Exhibit G, which requirements are applicable to projects not funded by an Airport Improvement Program grant from the Federal Aviation Administration.
- K. "Fee Schedule": the fee schedule set forth in the attached Exhibit B, as adjusted for any extension period(s) pursuant to Section 4 below.
- L. "General Provisions": the General Provisions set forth in the attached Exhibit E.
- M. "Indemnitees": the Authority, TBI Airport Management, Inc., the Cities of Burbank, Glendale and Pasadena, and the respective officers, agents, employees, and volunteers of each such entity.
- N. "RFB": the Authority's Bid Solicitation Package for Project No. E26-02 On-Call Pavement Improvement Contract.
- O. "Services": All services specified in the attached Exhibit D.
- P. "Special Provisions": the Special Provisions set forth in the attached Exhibit F.
- Q. "Specifications": the Hollywood Burbank Airport's Specifications and Line Items for On-Call Pavement Improvement Contract (February 2026) set forth in the attached Exhibit D.
- R. "Task Order": a written work order, in the form set forth in the attached Exhibit C, that specifies a pavement improvement project to be performed by Contractor.

1.3 Services

- A. Contractor shall perform the Services in a timely, regular basis in accordance with the Contract Documents, Federal Aviation Administration Advisory Circular 150/5380-6C, and applicable laws. Contractor shall provide all labor, equipment, supplies, and materials as required for the performance of the Services. Time is of the essence in the performance of this Agreement.
- B. Contractor shall perform the Services on a Task Order basis. Task Orders with a value of \$75,000 or less may be approved by the Executive Director without prior Authority Commission approval. Task Orders with a value in excess of \$75,000 require Authority Commission approval.
- C. Each Task Order shall be executed and dated by the ADR and Contractor prior to Contractor's commencement of work on the project. Task Orders shall be numbered sequentially and shall be subject to all terms and conditions of this Agreement. The Authority is not required

to issue Contractor any minimum number of Task Orders. The Authority may contract with one or more other firms for performance of the Services.

- D. Contractor shall perform all work to professional standards and in a manner reasonably satisfactory to the Authority. Contractor shall consult the ADR for any decisions that must be made by the Authority. Contractor shall promptly notify the ADR of any unsafe condition that Contractor discovers at the Airport.
- E. In the event any claim is brought against the Authority relating to Contractor's performance of the Services, Contractor shall provide any reasonable assistance and cooperation that the Authority might require.

1.4 Term

- A. The base term of this Agreement shall commence on the Commencement Date and shall expire on the Expiration Date unless extended or earlier terminated as provided below.
- B. The Authority shall have two options by which it may extend the term of this Agreement by one year at a time in its sole discretion. The extension options may be exercised sequentially or concurrently. To exercise an extension option, the Authority shall give written notice to Contractor at least 30 days prior to the then-scheduled expiration date.
- C. If Contractor breaches this Agreement and fails to cure such breach within seven days of written notice from the ADR, then the Authority may immediately terminate this Agreement for cause. Either party may terminate this Agreement for convenience upon 15 days prior written notice to the other party.

1.5 Compensation

- A. The Authority shall compensate Contractor for performance of the Services, and Contractor agrees to accept as full satisfaction for such work, payment on a Task Order basis according to the Fee Schedule or any lesser best and final offer submitted for a particular project at the Authority's request. In no event shall the compensation payable to Contractor under this Agreement exceed the Contract Limit.
- B. For each extension option exercised by the Authority, the Fee Schedule shall be increased by 3% unless the Authority approves a greater increase based on the "Construction Cost Index of Engineering News Record" as applicable to the Los Angeles Region. Approval or denial of a greater increase shall be at the sole discretion of the Authority.

- C. Contractor shall submit monthly invoices to the Authority for performance of Task Orders. Each invoice shall itemize the work performed during the billing period and the amount due. Within 10 business days of receipt of each invoice, the Authority shall notify Contractor in writing of any disputed amounts on the invoice. Within 30 calendar days of receipt of each invoice, the Authority shall pay all undisputed amounts on the invoice. The Authority shall not withhold applicable taxes or other authorized deductions from the payments, and Contractor shall pay all required taxes on the payments.
- D. If Contractor fails to perform the work in a diligent and satisfactory manner, the Authority may, after seven days' written notice to Contractor, perform the work or cause it to be performed by a third party. Contractor shall reimburse the Authority for any expense incurred; alternatively, the Authority may deduct the amount from any sum owed to Contractor.
- E. This Agreement does not guarantee a minimum payment or a retainer fee for Contractor. Payments to Contractor will be based on the number of Task Orders issued by the Authority and completed by Contractor.

1.6 Subcontractors

Prior to execution of a Task Order, Contractor shall submit a list of the subcontractors proposed to be utilized on the Task Order as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code Section 4100, et seq.). Contractor shall self-perform not less than 20% of each Task Order.

1.7 Bonds

Prior to commencement of any Task Order with a value in excess of \$25,000, Contractor shall provide the Authority with a payment bond and a performance bond in the amount of the Task Order. Before acceptance of the Task Order project, Contractor shall submit proof from the surety that the performance bond has been extended for one year from the project acceptance date. All bonds must be issued by a California admitted surety insurer having a rating of not less than A:X in A.M. Best's Insurance Guide, and must be on the forms set forth in the RFB unless otherwise acceptable to the Authority.

1.8 Labor Code Provisions

- A. The parties acknowledge that the performance of the Services constitutes a "public works project" within the scope of the Prevailing Wage Law (Labor Code Section 1720 et seq.).

- B. In accordance with Labor Code Sections 1725.5 and 1771.1, no contractor or subcontractor shall be qualified to bid on, be listed in a bid, subject to the requirements of Public Contract Code Section 4104, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Section 1725.5 (with limited exceptions for bid purposes only under Labor Code Section 1771.1(a)).
- C. The Services are subject to compliance monitoring and enforcement by the DIR. Contractor shall post job site notices, as prescribed by regulation.
- D. Copies of the prevailing rate of per diem wages established by the DIR are on file at the Airport and shall be made available on request.
- E. Contractor shall comply with Labor Code Section 1775 and shall forfeit, as a penalty to the Authority, the sum of \$200 for each calendar day or portion thereof during which Contractor or any subcontractor has paid to any worker employed on the Services an amount less than that required by the DIR.
- F. Contractor agrees to comply with the provisions of Labor Code Section 1776, which generally require Contractor and each subcontractor to: (i) keep accurate payroll records; (ii) certify and make such payroll records available for inspection; (iii) inform the Authority of the location of the records; and (iv) forfeit, as a penalty to the Authority, the sum of \$100 for each calendar day or portion thereof for each worker until such payroll records have been provided in response to a request pursuant to Section 1776. Contractor is responsible for compliance with Section 1776 by itself and all its subcontractors. Contractor shall provide a copy of such payroll records to the Authority.
- G. Contractor shall forfeit, as penalty to the Authority, the sum of \$25 dollars for each worker employed in the execution of this Agreement by Contractor or subcontractors for each calendar day during which such worker is required or permitted to work more than eight hours in any one calendar day and 40 hours in any one calendar week, in violation of Labor Code Section 1810 et seq.
- H. Contractor shall not perform the Services with any subcontractor that has been debarred or suspended pursuant to Labor Code Section 1777.1 or any other federal or state law providing for the debarment of contractors from public works. Contractor and subcontractors (including principals and employees of Contractor and subcontractors) shall not be debarred or suspended throughout the term of this Agreement pursuant to Labor Code Section 1777.1 or any other federal or state law providing for the debarment

of contractors from public works. If Contractor or any subcontractor becomes debarred or suspended during the term of this Agreement, then Contractor shall immediately notify the Authority.

- I. Labor Code Sections 1860 and 3700 provide that every contractor will be required to secure the payment of compensation to its employees. In accordance with the provisions of Labor Code Section 1861, by signing this Agreement, Contractor certifies as follows:

“I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers’ compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.”

1.9 Independent Contractor Status

Contractor is, and shall at all times, remain as to the Authority, an independent contractor. Contractor shall have no power to incur any debt, obligation, or liability on behalf of the Authority or to act otherwise on behalf of the Authority as an agent. Neither the Authority nor any of its officers, employees, agents, or volunteers shall have control over the conduct of Contractor except as set forth in this Agreement.

1.10 Airport Rules and Regulations

Contractor shall comply with the Airport Rules and Regulations. Contractor acknowledges that the Airport Rules and Regulations are available on the Authority’s webpage (hollywoodburbankairport.com). Violations of the Airport Rules and Regulations by Contractor or its personnel shall be punishable as stated in the Airport Rules and Regulations including by administrative fines.

1.11 Work Product Ownership

All reports, documents, or other written material developed by Contractor in the performance of this Agreement shall be and remain the property of the Authority without limitation upon use or dissemination by the Authority.

1.12 Confidentiality

Contractor shall preserve the confidentiality of all nonpublic data, documents, discussion, or other information that is developed or received by it in connection with this Agreement. Contractor shall not disclose such information without the prior written authorization of the

Executive Director. Upon request, all Authority data shall be returned to the Authority at expiration or termination of this Agreement. Contractor's obligations under this section shall survive expiration or termination of this Agreement.

1.13 Conflict of Interest

Contractor shall not maintain or acquire any financial interest that may be affected by the Services. Contractor shall avoid the appearance of having any financial interest that would conflict in any manner with the Services.

1.14 Indemnification

- A. Contractor shall defend, hold harmless, and indemnify the Indemnitees from and against any actual, alleged, or threatened causes of action, claims, costs, damages, demands, expenses (including fees of accountants, attorneys, and other professionals), judgments, liens, losses, penalties, and proceedings of any nature whatsoever (collectively, "Liabilities") that arise out of the acts or omissions of Contractor or its subcontractors in connection with this Agreement.
- B. Contractor's obligations under this section shall survive expiration or termination of this Agreement and shall apply regardless of whether or not any insurance policies are determined to be applicable to the Liabilities.
- C. Contractor's obligations under this section shall apply, without limitation, to Liabilities that partially involve active or passive negligence by the Authority. However, Contractor's obligations under this section shall not apply to Liabilities that arise from the sole negligence or willful misconduct of the Authority, as determined by final arbitration or court decision or by consensus of the parties.

1.15 Insurance

Without limiting Contractor's defense, hold harmless, and indemnification obligations under this Agreement, Contractor shall maintain policies of insurance as specified in the General Provisions.

1.16 Suspension

The ADR may suspend all or any part of the Services for the Authority's convenience or for work stoppages beyond the control of the parties. Written notice of a suspension shall be given to Contractor.

1.17 Notices

Any notices, invoices, or other documents related to this Agreement shall be deemed received on: (a) the day of delivery, if delivered by hand during regular business hours or by e-mail before

or during regular business hours; (b) the business day after delivery, if delivered by e-mail after regular business hours; or (c) on the second business day following deposit in the United States mail, postage prepaid, to the addresses listed below, or to such other addresses as the parties may, from time to time, designate in writing. Any notice delivered by e-mail that concerns breach or termination of this Agreement shall concurrently be sent by deposit in the United States mail, postage prepaid but such notice shall be deemed received on the day of e-mail delivery.

Authority	Contractor
Burbank-Glendale-Pasadena Airport Authority	Griffith Company
2627 Hollywood Way	3050 East Birch Street
Burbank, CA 91505	Brea, CA 92821
Attn: Vincent Nguyen	Attn: Daniel W. Leeper
E-mail: VNguyen@bur.org	E-mail: dleeper@griffithcompany.net

1.18 Assignability

Contractor shall not assign, transfer or subcontract any interest in this Agreement or the performance of any of its obligations without the Executive Director's prior written consent. This prohibition is not intended to preclude, and shall not be interpreted as precluding, Contractor from utilizing subcontractors identified in Contractor's proposal for the Services. Any attempt by Contractor to assign, transfer or subcontract any rights, duties or obligations in violation of this prohibition shall be void.

1.19 Rules of Interpretation

Unless otherwise indicated or apparent from the context, the following rules of interpretation shall apply. The singular includes the plural and vice versa; the term "shall" is mandatory and the term "may" is permissive; the term "business day" means a non-holiday weekday; the term "regular business hours" means the period from 8:00 a.m. PST to 5:00 p.m. PST on a business day; and the terms "include," "includes," and "including" are illustrative and non-exhaustive.

1.20 Litigation

In the event that either party shall commence legal action to enforce or interpret this Agreement, the venue for litigation shall be Los Angeles County, California. The interpretation of this Agreement shall not be resolved by any rules of construction providing for interpretation against the party who causes the uncertainty to exist or against the party who drafted the disputed language.

1.21 Exhibits

Exhibits A through I are incorporated into this Agreement by reference. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of Exhibit G, the provisions of Exhibit G shall prevail. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of other Exhibits, the provisions of this Agreement shall prevail.

1.22 Incorporation of Mandatory Language

Each provision required by law to be inserted in this Agreement shall be deemed to be inserted and this Agreement shall be read and enforced as though such provision were included. If through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon request of either party this Agreement shall promptly be amended to make such insertion or correction.

1.23 Incorporation of Task Orders

Executed Task Orders are incorporated into this Agreement by reference. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of a Task Order, the provisions of this Agreement shall prevail.

1.24 Entire Agreement

This Agreement (and the attached Exhibits) represents the entire and integrated contract between the parties regarding the Services. This Agreement supersedes all prior oral or written negotiations, representations and contracts related to the Services. This Agreement may not be amended, nor any provision or breach waived, except in a writing that is signed by the parties and that expressly refers to this Agreement.

[SIGNATURE ON FOLLOWING PAGE]

TO EXECUTE THIS AGREEMENT, the parties have caused their authorized representatives to sign below.

Griffith Company



Daniel W. Leeper, Regional Manager
☐ Chairperson ☐ President ☐ Vice President



Diann Senn
☐ Secretary ☒ Asst. Secretary
☐ Chief Finance Officer ☐ Asst. Treasurer

[Pursuant to Corporations Code Section 313, both signature lines must be executed unless the signatory holds at least one of the offices designated on each line.]

Jess A. Talamantes, President

Approved as to form:

Richards, Watson & Gershon
A Professional Corporation

EXHIBIT A

CONTRACTOR'S EXPERIENCE FORM

(attached)

HOT MIX ASPHALT PAVING EXPERIENCE

PROJECT #1

Project Title:	Taxiway Reconstruct Project D, E, F & Q	
Start Date & Substantial Completion Date:	11/2024	12/2025
Type of Work:	Full depth Reconstruction of six segments of connector taxiways	
Airport Name:	Los Angeles World Airport	
Sponsor (Owner) Name:	Los Angeles World Airport	
Sponsor Address:	7301 World Way West, 10th Floor	
Sponsor City, State, Zip	Los Angeles, CA 90045	
Sponsor Telephone Number:	(424) 646-5853	
Sponsor Representative:	Rufino Lozano	
Company/Firm that performed the Work:	Griffith Company	
Work performed as:	☒ Prime Contractor	☐ Subcontractor
Name of Prime Contractor:	Griffith Company	
Prime Contractor Telephone Number:	(714) 984-5500	
Prime Contractor Representative:	Baktash Karimi	
Total Contract Amount:	\$13,604,876.00	
HMA Pavement Contract Amount:	\$1,828,475.00	
Quantity Placed:	6,222 TONS	6.5" in. (avg. depth)
PWL Method used to Calculate Pay Factor?	☒ YES	☐ NO
Percentage of Work Performed at Night:	14%	

HOT MIX ASPHALT PAVING EXPERIENCE

PROJECT #1

Project Title:	Taxilane K & Taxilane U Long Beach Airport	
Start Date & Substantial Completion Date:	12/2023	04/2024
Type of Work:	Full depth Reconstruction of Taxi lanes K & U	
Airport Name:	Long Beach Airport	
Sponsor (Owner) Name:	City of Long Beach	
Sponsor Address:	333 W Ocean Blvd. 6th Floor	
Sponsor City, State, Zip	Long Beach, CA 90802	
Sponsor Telephone Number:	(562) 570-2616	
Sponsor Representative:	Henry Monfiero	
Company/Firm that performed the Work:	Griffith Company	
Work performed as:	☒ Prime Contractor	☐ Subcontractor
Name of Prime Contractor:	Griffith Company	
Prime Contractor Telephone Number:	(714) 984-5500	
Prime Contractor Representative:	Baktash Karimi	
Total Contract Amount:	\$6,993,316.62	
HMA Pavement Contract Amount:	\$1,044,465	
Quantity Placed:	4,604 TONS	5" in. (avg. depth)
PWL Method used to Calculate Pay Factor?	☒ YES	☐ NO
Percentage of Work Performed at Night:	25%	

HOT MIX ASPHALT PAVING EXPERIENCE

PROJECT #1

Project Title:	Taxiway Shoulder Improvement	
Start Date & Substantial Completion Date:	12/2022	03/2023
Type of Work:	Remove and replace AC in Shoulder of taxiway	
Airport Name:	San Bernardino Int. Airport	
Sponsor (Owner) Name:	San Bernardino Int. Airport	
Sponsor Address:	1601 E Third Street, Suite 100	
Sponsor City, State, Zip	San Bernardino, CA 92408	
Sponsor Telephone Number:	(909) 382-4100	
Sponsor Representative:	Kevin Vejar	
Company/Firm that performed the Work:	Griffith Company	
Work performed as:	☒ Prime Contractor	☐ Subcontractor
Name of Prime Contractor:	Griffith Company	
Prime Contractor Telephone Number:	(714) 984-5500	
Prime Contractor Representative:	Caleb Reynoldson	
Total Contract Amount:	\$3,872,572.93	
HMA Pavement Contract Amount:	\$847,550	
Quantity Placed:	7,705 TONS	4" in. (avg. depth)
PWL Method used to Calculate Pay Factor?	☒ YES	☐ NO
Percentage of Work Performed at Night:	0%	

EXHIBIT B

BID SHEETS/FEE SCHEDULE

(attached)

Item	Description	Technical Specification	Unit	Unit Price
1a	Mobilization - Airside	C-105	LS	\$ 25,000.00
1b	Mobilization - Landside	C-105	LS	\$ 20,000.00
2a	Erosion, Sediment and Chemical Control Plan - Airside	C-102, 13	LS	\$ 11,800.00
2b	Erosion, Sediment and Chemical Control Plan - Landside	C-102, 13	LS	\$ 4,000.00
2c	Dust Control	14	DAY	\$ 7,260.00
3	Demolition and Removal of Asphalt (Including Curbs)	1	CY	\$ 249.00
4	Demolition and Removal of PCC (including curbs)	1	CY	\$ 249.00
5	Saw Cutting – Asphalt Pavement 1” to 4" Thick	1	LF	\$ 7.30
6	Surface preparation, excavate, and dispose	2	CY	\$ 470.00
6a	Bridging Aggregate	2	CY	\$ 235.00
7	Geotech Fabric – Subgrade Reinforcement	2	SY	\$ 22.50
8	Crack Sealing in Asphalt Pavement	3	LF	\$ 15.00
9	Caltrans Asphalt Concrete (Partial Depth Repair)	4	TN	\$ 362.00
10	Greenbook Asphalt Concrete (Partial Depth Repair)	4	TN	\$ 362.00
11	Temporary Protection – Steel Plates	4	SF/ DAY	\$ 10.50
12	Caltrans Asphalt Concrete	5	TN	\$ 317.00
13	Greenbook Asphalt Concrete	5	TN	\$ 317.00
14	AC Curb installed	6	LF	\$ 23.00
15	Slurry Seal Coat	7	SY	\$ 40.50
16	Dust Cap Slurry Seal	7	SY	\$ 38.50
17	Rubberized Emulsion-Aggregate Slurry	8	SY	\$ 18.50
18	Raise or Lower Covers, Frames, or Grates of Existing Manholes & Storm Inlets to Grade	-	EA	\$ 3,575.00
19	Concrete Wheel Stop Installed	9	EA	\$ 721.00
20	Provide, Place, Remove Temporary Reflective Pavement Markers	9	EA	\$ 36.00
21	Guard Railing (New) Post & Rails	9	LF	\$ 431.00
22	Remove and Dispose Guard Rails	9	LF	\$ 115.00
23	Delineators White or Yellow	9	EA	\$ 541.00
24	Provide In-Place Raised Reflective (Single or Double Faced) Pavement Markers (Blue/White/Yellow)	9	EA	\$ 144.00
25	Road Signs on Single Post	9	EA	\$ 866.00
26	Aggregate Base In Place	10	CY	\$ 264.00
27	Portland Cement Concrete Pavement for Non-Airfield	11	CY	\$ 1,765.00
28	Miscellaneous Concrete Structures	11	SF	\$ 85.50
29	PCC Curb & Gutter Installed	11	LF	\$ 138.00
30	PCC Swale Installed 6" Thick	11	CY	\$ 2,075.00
31	Flag person for Traffic Control	12	HR	\$ 540.00
32	Traffic Control Sign	12	WK	\$ 87.50
33	Low Profile Barricade	15	EA	\$ 422.00
34	Pavement Removal	P-101, A-9, A10	CY	\$ 242.00
35	Cold Milling Asphalt Pavement	P-101, A-9, A10	CY	\$ 145.00
36	Clearing	P-151	SY	\$ 6.60
37	Clearing and grubbing	P-151	SY	\$ 9.60
38	Unclassified Excavation	P-152	CY	\$ 133.00
39	Import Barrow	P-152	CY	\$ 231.00
40	Over Excavation	P-152	CY	\$ 323.00
41	Subgrade Preparation	P-152	SY	\$ 27.00
42	Controlled low-Strength Material (CLSM)	P-153	CY	\$ 300.00
43	Subbase Course	P-154	CY	\$ 229.00
44	Separation Geotextile	P-154	SY	\$ 6.75

45	Crushed Aggregate Base Course	P-209, A-10	CY	\$ 566.00
46	Lean Concrete Base Course	P-306	CY	\$ 1,380.00
47	P-401 Asphalt Surface Course (Up to 50 Tons)	P-401, A-9, A-10	TN	\$ 1,425.00
48	P-401 Asphalt Surface Course (51 to 200 Tons)	P-401	TN	\$ 684.00
49	P-401 Asphalt Surface Course (201 to 2,000 Tons)	P-401	TN	\$ 359.00
50	Asphalt Grinding	P-401, P-403	SY	\$ 12.00
51	P-403 Asphalt Surface Course (Up to 50 Tons)	P-403, A-9, A-10	TN	\$ 1,395.00
52	P-403 Asphalt Surface Course (51 to 200 Tons)	P-403	TN	\$ 657.00
53	P-403 Asphalt Surface Course (51 to 2000 Tons)	P-403	TN	\$ 344.00
54	P-501 Portland Cement Concrete Pavement	P-501	CY	\$ 1,470.00
55	High Early Strength Portland Cement Concrete Pavement	P-501	CY	\$ 2,085.00
56	Smooth Dowels	P-501	LB	\$ 6.00
57	Reinforcing Steel	P-501	LB	\$ 6.00
58	Emulsified Asphalt Prime Coat	P-602	GAL	\$ 5.75
59	Emulsified Asphalt Tack Coat	P-603	GAL	\$ 9.45
60	Asphalt Surface Treatment (One-to-One Dilution Emulsion)	P-608	SY	\$ 23.00
61	Asphalt Surface Treatment (Two-to-One Dilution Emulsion)	P-608	SY	\$ 23.00
62	Asphalt Surface Treatment (Rapid Cure)	P-608-R	SY	\$ 23.00
63	Concrete for Miscellaneous Structures	P-610	CY	\$ 5,890.00
64	High Early Strength Concrete for Miscellaneous Structures	P-610	CY	\$ 6,350.00
65	Reinforcing Steel	P-610	LB	\$ 5.75
66	Saw-Cut Grooving	P-621	SY	\$ 541.00
67	Emulsified Asphalt for Slurry Coat	P-626	SY	\$ 15.50
68	Jet Fuel Resistant Seal Coat	P-630	SY	\$ 72.00
69	Jet Fuel Resistant Joint Resealing	A-1	LF	\$ 57.50
70	Interior Cavity & Spall Repair PCC	A-2	SF	\$ 2,165.00
71	PCC Spall Repair - Corner & Edge	A-3	SF	\$ 2,165.00
72	Full Depth PCC Pavement Repair	A-4	LF	\$ 10.00
73	Crack Repair PCC Pavement (Non-Structural)	A-5	LF	\$ 15.00
74	Crack Repair PCC Pavement (Structural)	A-6	CF	\$ 5,770.00
75	Polymer Modified Concrete for Trench Drain Repair	A-7	LF	\$ 150.00
76	Crack Repair HMA Pavement, Type 1	A-8	LF	\$ 15.00
77	Crack Repair HMA Pavement, Type 2	A-8	LF	\$ 15.00
78	Crack Repair HMA Pavement, Type 3	A-8	LF	\$ 15.00
79	Saw Cutting - Asphalt Pavement 1" - 4" Thick	A-9, A-10	EA	\$ 13.50
80	Bollard (4-inch diameter)	A-11	EA	\$ 6,580.00
81	Bollard (6-inch diameter)	A-11	EA	\$ 6,740.00
82	Manhole, 3'x4' with 24" Aircraft Rated Cover	D-751	EA	\$ 41,780.00
83	Catch Basin, 3'x3' with Aircraft Rated/Airfield Grate	D-751	EA	\$ 41,200.00
84	Inlet, 3'x3' Precast Concrete, Traffic Rated	D-751	EA	\$ 15,340.00
85	Inspection Holes with 12" Cover, Aircraft Rated	D-751	EA	\$ 10,190.00
86	Install Fence, (Permanent 8') with 3 Strands Barbed Wire	F-161	LF	\$ 455.00
87	Install Fence, (Permanent 8') with Outriggers and 3 Strands Barbed Wire on Each Outrigger	F-161	LF	\$ 462.00
88	Green Fabric for Fence (Privacy Screen)	F-161	LF	\$ 5.85
89	CAT 6 and 6A Twisted Cable	54	LF	\$ 29.00
90	Fiber Optic Cable	54	LF	\$ 50.00
91	Underground Electrical Duct Banks and Conduits - One 1-inch Conduit (Direct Buried) [1 to 500 feet]	54	LF	\$ 177.00
92	Underground Electrical Duct Banks and Conduits - One 1-inch Conduit (Direct Buried) [500 feet or more]	54	LF	\$ 70.00
93	Underground Electrical Duct Banks and Conduits - One 2-inch Conduit (Direct Buried) [1 to 500 feet]	54	LF	\$ 182.00

94	Underground Electrical Duct Banks and Conduits - One 2-inch Conduit (Direct Buried) [500 feet or more]	54	LF	\$ 72.50
95	Underground Electrical Duct Banks and Conduits - One 2-inch Conduit (Concrete Encased) [1 to 500 feet]	55	LF	\$ 209.00
96	Underground Electrical Duct Banks and Conduits - One 2-inch Conduit (Concrete Encased) [500 feet or more]	55	LF	\$ 98.50
97	Underground Electrical Duct Banks and Conduits - Two 2-inch Conduit (Concrete Encased) [1 to 500 feet]	55	LF	\$ 234.00
98	Underground Electrical Duct Banks and Conduits - Two 2-inch Conduit (Concrete Encased) [500 feet or more]	55	LF	\$ 117.00
99	Underground Electrical Duct Banks and Conduits - Two 2-inch Conduit (Direct Buried) [1 to 500 feet])	54	LF	\$ 187.00
100	Underground Electrical Duct Banks and Conduits - Two 2-inch Conduit (Direct Buried) [500 feet or more]	54	LF	\$ 91.00
101	Electrical LV, Electrical HV, and Communication - Handhole/Pullbox	55	EA	\$ 70,300.00
102	Electrical Manholes and Junction Structures - H20 Rated	55	EA	\$ 129,500.00
103	Electrical Manholes and Junction Structures - Adjust Handhole to Grade	55	EA	\$ 81,500.00

EXHIBIT C

SAMPLE TASK ORDER FORM

(attached)



HOLLYWOOD BURBANK AIRPORT
PROJECT NUMBER RFB E26-02
Procurement Department

2627 N. Hollywood Way

Burbank, CA 91505

P: 818-840-8840 E: purchasing@bur.org

Burbank-Glendale-Pasadena Airport Authority

To Firm:	
SA/P.O. No:	Account No.:
T.O. Order No:	Effective Date:
T.O. Revision No:	Revision Date:
Originator:	Phone No:

This Task Order (TO) is issued pursuant to the applicable Services Agreement (SA) between the Burbank-Glendale-Pasadena Airport Authority (Authority), owner/operator of Hollywood Burbank Airport and your Firm, pursuant to terms and conditions of the SA indicated, for the services described below.

Additional sheet(s) attached? ☐ Yes ☐ No Emergency? ☐ Yes ☐ No

Please check if applicable: ☐ Statement of Work attached ☐ Specification attached ☐ Other attachment

DESCRIPTION / SERVICE CATEGORY:

Task Order Pricing Basis

Time & Materials, Fee Schedule/Rates: ☐	
Estimated not-to-exceed amount:	\$ _____
Estimated revision amount:	\$ _____
Total of previous revisions:	\$ _____
Current estimated not-to-exceed amount:	\$ _____

This Task Order is also a Notice to Proceed immediately with the services described, with final completion on _____. **Time shall be of the essence in the performance of this Task Order.**

All services are subject to acceptance by the Authority. All required supporting documentation to be included with Invoice Applications for Payment including a copy of the fully executed Task Order.

Except as may be modified herein, all other contract terms and conditions are unchanged.

This Task Order is accepted and agreed by authorized representatives of the parties as indicated below:

	Burbank-Glendale-Pasadena Airport Authority
_____	_____
Company Name	Company Name
_____	_____
Authorized Signature	Authorized Signature
_____	_____
Name	Name
_____	_____
Title	Title
_____	_____
Date	Date

EXHIBIT D

SPECIFICATIONS

(attached)

HOLLYWOOD BURBANK AIRPORT'S SPECIFICATIONS AND LINE ITEMS

FOR

ON-CALL PAVEMENT IMPROVEMENT CONTRACT

February 2026

TABLE OF CONTENTS

Demolition and Removal of Pavement	L1 - 1
Replacement Pavement Construction (Subgrade Preparation).....	L2 - 1
Sealing Cracks in HMA Pavements.....	L3 - 1
Partial Depth Patch Repair of HMA Pavement.....	L4 - 1
Full Depth Patch Repair of HMA Pavement	L5 - 1
Asphalt Concrete Overlay – For Vehicular Traffic.....	L6 - 1
Asphalt Slurry Seal	L7 - 1
Modified Asphalts and Slurries	L8 - 1
Traffic Controls (Striping), Parking Stall Bumpers, Guard Rail, Delineator, and Pavement Markers.....	L9 - 1
Select Aggregate Base	L10 - 1
Portland Cement Concrete, Minor Pavement Repairs	L11 - 1
Methacrylate Resin Bridge Deck Treatment.....	L12 - 1
Prepaving Herbicide Application	L13 - 1
Traffic Control.....	L14 - 1
Erosion, Sediment, and Chemical Control Plan.....	L15 - 1
Section 60 Control of Materials	S-60 - 1
Item C-100 Contractor Quality Control Program (CQCP)	C-100 - 1
Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control.....	C-102 - 1
Item C-105 Mobilization	C-105 - 1
Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL).....	C-110 - 1
Item P-101 Preparation and Removal of Existing Pavements	P-101 - 1
Item P-151 Clearing and Grubbing	P-151 - 1
Item P-152 Excavation, Subgrade, and Embankment.....	P-152 - 1
Item P-153 Controlled Low-Strength Material (CLSM).....	P-153 - 1
Item P-154 Subbase Course	P-154 - 1
Item P-209 Crushed Aggregate Base Course.....	P-209 - 1
Item P-306 Lean Concrete Base Course	P-306 - 1
Item P-401 Asphalt Mix Pavement	P-401 - 1
Item P-403 Asphalt Mix Pavement Base, Leveling and Surface Course.....	P-403 - 1

Item P-501 Cement Concrete Pavement	P-501 - 1
Item P-602 Emulsified Asphalt Prime Coat.....	P-602 - 1
Item P-603 Emulsified Asphalt Tack Coat	P-603 – 1
Item P-608 Emulsified Asphalt Seal Coat.....	P-608 - 1
Item P-608-R Rapid Cure Seal Coat	P-608-R - 1
Item P-610 Concrete for Miscellaneous Structures.....	P-610 - 1
Item P-621 Saw-Cut Grooves	P-621 - 1
Item P-626 Emulsified Asphalt Slurry Seal Surface Treatment.....	P-626 - 1
Item P-630 Refined Coal Tar Emulsion Without Additives, Slurry Seal Surface Treatment.....	P-630 - 1
Item F-161 Wire Fence with Steel Posts.....	F-161 - 1
Item D-751 Manholes, Catch Basins, Inlets and Inspection Holes	D-751 - 1

Airfield Repair Specifications

A-1. Joint Resealing Repair.....	A-1 - 1
A-2. Interior Cavity and Spall Repair	A-2 - 1
A-3. PCC Spall Repair - Slab Corner and Edge.....	A-3 - 1
A-4. Full Depth PCC Pavement Repair	A-4 - 1
A-5. Crack Repair PCC Pavement (Non-Structural).....	A-5 - 1
A-6. Structural Crack Repair PCC Pavement	A-6 - 1
A-7. Trench Drain Spall Repair	A-7 - 1
A-8. Crack Repair - HMA Pavements	A-8 - 1
A-9. Partial Depth Patch Repair HMA Pavement.....	A-9 - 1
A-10. Full Depth Patch Repair of HMA Pavement	A-10 - 1
A-11. Bollards	A-11- 1

Bid Items

List of Bid Items.....	B - 1

1 DEMOLITION AND REMOVAL OF PAVEMENT

1.1 DESCRIPTION

1.1.1 General Requirements:

The work includes the demolition and/or removal of all construction indicated or specified in these specifications and applicable plans. All materials resulting from demolition work, except as indicated or specified otherwise, shall become the property of the Contractor and shall be removed from the limits of Hollywood Burbank Airport (BUR) property. There shall be no stockpiling of these materials on BUR property, unless otherwise approved by the Hollywood Burbank Airport Project Manager or Appointed Representative (APM) for temporary purposes.

1.1.2 Submittals:

Submit for approval a plan for the demolition and removal work to the APM . After the contract is awarded, prior to the commencement of each Task Order, the Contractor shall meet with the APM and discuss the demolition and removal plan. The plan shall include procedures for coordination with other work in progress. Include in the plan a detailed description of the methods or the applicable specifications section and the equipment to be used for each operation and the sequence of operations. Contractor must ensure any operational impacts are addressed and/or passenger access remain available, unless otherwise approved.

1.1.3 Dust Control:

The Contractor shall conduct all operations in a manner that minimizes dust generation and prevents dust from becoming a hazard to aircraft operations or a nuisance to airport users. Dust control shall be accomplished by applying water or other approved dust palliatives to haul roads, access roads, and construction areas as necessary to maintain dust within acceptable limits. Water used for dust control shall be clean and free of harmful substances. The Contractor shall provide sufficient equipment and personnel to ensure continuous dust suppression during dry or windy conditions. Dust control measures shall be maintained until all disturbed areas are stabilized.

1.1.4 Protection of Utility Lines:

Contractor is responsible for the protection of the utility lines impacted by the construction and must perform due diligence required to investigate the utility line location, depth, extent, and type. Contractor shall also specify the method for how they will protect from damage existing utility lines prior to demolition work. Repair damaged utility lines as directed at no additional cost to BGPAA.

1.1.5 Protection of Personnel:

Where the presence of pedestrians and drivers are anticipated in the area of removal work, barricades for traffic should be provided and used and advance notice shall be given to the APM prior to beginning any such work.

1.1.6 Use of Explosives:

Use of explosives will not be permitted.

1.1.7 Removal of Existing Asphalt and Concrete:

Within the area designated for replacement of existing pavement and concrete, the existing surface shall be removed to a total depth as required to prepare the surface. The edges of area of removal shall be saw cut neatly and vertically. The edge of existing asphalt and concrete pavement against which new pavement abuts shall be always protected from damage. Each area of removal shall be left in a condition suitable for base preparation as specified.

Saw cut using a diamond blade and make cuts perpendicular to the pavement surface. Saw cuts must be the full pavement depth unless otherwise shown. Saw cut at concrete joints to remove entire slabs including dowels, tie bars and reinforcing steel as required. For partial-slab areas, APM determines the exact saw cut locations.

Relief saw cuts within the repair/removal boundary limits to assist with not damaging, cutting, or chipping the adjacent existing slabs. Do not impact the surface within 18 inches of pavement remaining in place.

1.1.8 Disposal of Debris:

Upon completion of demolition, the job area shall be cleared of all debris at the expense of the Contractor. Broken asphalt and/or Portland cement concrete and base material that resulted from demolition shall be removed and transported in a manner that will prevent spillage on streets or adjacent areas. Stockpiling of demolition debris within the limits of BUR is not permitted.

1.1.9 Hauling:

Hauling and disposal shall comply with federal, state, and local regulations.

1.2 METHOD OF MEASUREMENT

1.2.1

Demolition and removal of pavement shall be measured for each type of pavement by the cubic yard of demolition and removal, completed and accepted by the APM. Saw cutting of asphalt and concrete pavement shall be measured by the linear foot of the depth specified and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, completed and accepted by the APM.

1.3 BASIS OF PAYMENT

1.3.1

Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, disposal, and for all labor, equipment, tools, and incidentals necessary to complete the bid items.

Payment will be made under:

Bid Item 3: Demolition and Removal of Asphalt (including curbs), per cubic yard

Bid Item 4: Demolition and Removal of PCC (including curbs), per cubic yard

Bid Item 5: Saw Cutting - Asphalt Pavement 1" to 4" Thick, per linear foot

END OF SPECIFICATION 1

2 SUBGRADE PREPARATION

2.1 GENERAL

2.1.1 Applicable Publications:

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

2.1.2 State of California, Department of Transportation:

Standard Specifications, Section 19, “Earthwork” (2024, or Latest Edition). Whenever this specification is referenced, the following is understood:

All references to statistical testing are deleted.

Whenever a discrepancy occurs between the Standard Specification and this specification, the APM shall provide the final determination.

All references to measurement and payment are deleted.

2.1.3 American Society for Testing & Materials (ASTM) Publications (Latest Editions):

C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
D2419	Standard Test Method for Test for Sand Equivalent Value of Soils and Fine Aggregates
D6398	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depths)
D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D4595	Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

2.1.4 Description:

This section also covers requirements for excavation and for compaction of succeeding layers after backfilling has been placed. Pavement construction for this work is covered in Specification Section 5, "Full Depth Patch Repair of HMA Pavement."

2.1.5 Certified Test Reports:

Submit certified test reports for the following: Sand, gravel, or common soil fill tested in accordance with ASTM C136 and ASTM D2487. Granular fill tested in accordance with ASTM C136 and ASTM D2419.

2.2 MATERIALS

2.2.1 Soil Materials:

In general, should be free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.

2.2.2 Granular Fill Capillary Water Barrier:

Granular fill for capillary water barrier shall conform to the general requirements for soil materials above and shall be a clean, coarse grained crushed stone, uncrushed gravel, or crushed gravel conforming to the following gradation: 90 to 100 percent passing the 3/4-inch sieve and zero to five percent passing the No. 4 sieve, and with a sand equivalent of not less than 50 when tested in accordance with ASTM D2419.

2.2.3 Fill and Backfill:

For drainage ditches, and under paving or concrete on grade shall consist of native materials which are free of boulders, cinders, roots, debris, wood scrap material, and other unsatisfactory material.

2.3 CONSTRUCTION METHODS

2.3.1 Surface Preparation:

2.3.1.1 Cutting Pavement, Curbs, and Gutters:

Make cuts with neat, vertical, parallel, straight lines one foot wider than trench width on each side of trenches and one foot beyond each edge of pits.

2.3.1.2 Excavation for surface preparation:

Keep excavations free from water while construction is in progress. Notify the APM immediately in writing in the event that it becomes necessary to remove hard, soft, weak, or wet material to a depth greater than indicated and an adjustment in contract price will be considered in accordance with "Differing Site Conditions" paragraph of the contract clauses. Excavations cut below the depths indicated shall unless otherwise specified, be refilled in 6-inch lifts with common soil and be compacted to 90 percent of ASTM D1557, maximum density. Soil disturbed or weakened by the Contractor's operations and soils permitted to soften from exposure to weather shall be excavated and refilled with sand or gravel and be compacted to 95 percent of ASTM D1557, maximum density. All Additional work of this nature will be at the Contractor's expense.

2.3.2 Filling and Backfilling:

2.3.2.1 Backfill:

Under pavement and concrete slabs, shall be placed in lifts of 4 inches thick and each lift shall be compacted as specified herein, before the overlaying lift is placed. Backfill adjacent to structural elements shall be placed, as far as practicable, as the adjacent structural elements have been completed and accepted. Backfill against constructed concrete or masonry only after 8 curing days have passed.

2.3.2.2 Fill for Capillary Water Barrier:

Granular fill shall be placed on a 2-inch layer of filter material over compacted subgrade in lifts of 4 inches and compacted with a minimum of two passes of hand-operated plate type vibratory compactor.

2.3.3 Compaction:

2.3.3.1 General compaction:

Use hand-operated type vibratory or other suitable hand tampers in areas not accessible to larger rollers or compactors. Be careful to avoid damaging pipes and protective pipe coatings. Compaction shall be in accordance with the following unless otherwise specified. If necessary, the Contractor's selected equipment and construction procedure shall be altered, changed or modified in order to meet the specified compaction requirements.

2.3.3.2 Compaction of bedding:

Compaction of bedding in rock compact to 95 percent and in soil compact to 90 percent of ASTM D1557, maximum density.

2.3.3.3 Subgrade soils in cut:

For subgrade preparation, except for primary roads or airfield pavements, soils shall have a density of 95 percent of ASTM D1557, maximum density to a depth of 12 inches; if the existing subgrade natural density is less than 95% percent of ASTM D1557, maximum density, it shall be compacted to that value.

If exposed soils are unstable or pumping, they shall be over-excavated 12 to 24 inches below existing grade and replaced with bridging aggregate underlain by geotextile fabric. The geotextile fabric shall consist of a woven geotextile, such as Mirafi HP series with a minimum tensile strength (at ultimate) of 4800 lbs/ft (ASTM D4595) or equivalent, as approved by the APM. The final depth of removal will depend upon the conditions observed in the field once over-excavation begins and shall be approved by APM. The geotextile fabric shall be placed in accordance with the manufacturer's recommendations.

Aggregate base material shall also be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557). Moisture content shall be maintained between -2 and +2 percent of optimum moisture content during compaction. The prepared subgrade shall be covered with aggregate base within 24 hours to reduce drying of the subgrade soil. Reduction of on-site soil moisture may be required prior to placement as fill. Processing may require ripping the material, disking to break up clumps, and blending to attain uniform moisture content necessary for compaction. Subgrade soils shall be in a stable, non-pumping condition at the time the aggregate base materials are placed and compacted. Adequate drainage (both surface and subsurface) shall be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

2.3.3.4 Bridging Aggregate:

Bridging aggregate shall consist of hard, durable crushed stone, gravel, or crushed rock free from clay lumps, organic matter, and other deleterious substances. Material shall conform to the gradation and quality requirement per tables below.

AGGREGATE GRADATION REQUIREMENTS

Sieve Sizes	Percentage Passing	
	3/4" Maximum	
	Operating Range	Contract Compliance
2"	—	—
1 1/2"	—	—
1"	100	100
3/4"	90-100	87-100

No. 4	35-60	30-65
No. 30	10-30	5-35
	2-	0-12

QUALITY REQUIREMENTS

Test	Operating Range	Contract Compliance
Resistance (R-value)	—	78 Min.
Sand Equivalent	25 Min.	22 Min.
Durability Index	—	35 Min.

2.3.3.5 Pavement repair:

See Specification Section 5 of this specification – Full Depth Patch Repair of HMA Pavement.

2.3.3.6 Base course:

Refer to Specification Section 10 of this specification – Select Aggregate Base.

Where subgrade stabilization is required as part of partial depth patch repair of HMA pavement, the existing aggregate base shall be removed. After the subgrade soil is stabilized and bridging aggregate is in place, the existing aggregate base shall be replaced and recompact as described in section 2.3.3.3.

2.3.4 Lawn Restoration:

2.3.4.1 Lawns:

Where excavations cross lawn areas, sod shall be replaced following backfilling, unless otherwise required. Carefully remove sod prior to excavation. Store and maintain sod until earthwork are completed. Any damaged sod shall be replaced at the Contractor's expense.

2.3.4.2 Field sampling and testing:

In addition to provisions set forth elsewhere in this contract, all sampling and testing shall be conducted by an approved testing laboratory. Test granular fill, bedding, and backfill for conformance to gradation limits in accordance with ASTM C136, ASTM D2419 and ASTM D2487. Test bedding and backfill materials for moisture density relations in accordance with ASTM D1557, Method D. Perform at least one of each of the required tests for each material used. Provide additional tests as specified above for each source change. Perform density tests in randomly selected locations and in accordance with ASTM D1556 as follows: one test per 400 lineal feet in each lift.

2.4 METHOD OF MEASUREMENT

Surface Preparation, Excavation and Disposal shall be measured by the cubic yard and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including associated removal, replacement, and recompacting of existing aggregate base, excavation, moisture control, and compaction of subgrade soils, completed and accepted by the APM. Bridging Aggregate in place, shall be measured by the cubic yard, completed and accepted by the APM. Geotextile Fabric shall be measured by the square yard, installed and accepted by the APM.

2.5 BASIS OF PAYMENT

Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, disposal, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete the bid item.

Payment will be made under:

Bid Item 6:	Surface preparation, excavation, and disposal, per cubic yard
Bid Item 6a:	Bridging Aggregate, per cubic yard
Bid Item 7:	Geotech Fabric - Subgrade Reinforcement, per square yard

END OF SPECIFICATION 2

3 SEALING CRACKS IN HMA PAVEMENTS

3.1 DESCRIPTION

3.1.1 General requirements:

The work of this Section consists of providing and installing a resilient and adhesive crack sealant, hot-applied, capable of effectively sealing cracks in the existing HMA pavements with crack sealant. It includes the removal of existing, loose, or damaged sealant material where applicable, preparation of the cracks, preparation of the sealant material, complete installation of the sealant repair system, and all necessary clean-up work and removal of all debris to an off-site location. The selection of sealant material products will be based on climate conditions, past performance of products, and at the discretion of the APM.

3.1.2 Submittals:

Prior to beginning work, submit to the APM for approval product data, test reports and certificates of compliance for aggregates and asphalt binder, and installation procedures for Sealant and Backer Rod. Do not begin work until written approvals of repair areas and repair types are given by the APM.

3.2 MATERIALS

3.2.1 Sealant:

The sealant material shall meet ASTM standards for the type of pavement and service for which the pavement is intended. The sealant material shall be a hot-applied, elastomeric, jet-fuel resistant type for HMA pavements conforming to the requirements of ASTM D6690. The sealant shall be packaged in a liquid state at delivery to site. It shall cure in 1 day for traffic application.

3.2.2 Alternate A for crack sealant:

The use of a silicone sealant is restricted to edge joints between HMA and PCC pavements only. Silicone should not be used to seal HMA pavement to HMA pavement joints. The sealant shall be a one-part silicone material formulation capable of being applied with a pressure applicator. The sealant shall be a self-leveling, nonacid producing and cure on exposure to air. The sealant shall be a low modulus type, as stated by the manufacturer, meet the following requirements of ASTM D5893 and is specifically approved by the APM.

3.2.3 Backer rod:

The backer rod material shall provide a bond - break for the joint sealant, and it shall be a closed cell polyethylene backer rod material, cross linked for hot-applied sealants and capable of withstanding temperatures of 395° F for 30 minutes and conforming to the requirements of ASTM D5249. The backer rod is a compressible, non-shrinking, nonabsorptive material whose melting point should be higher than the pouring temperature of the sealant. The backer rod shall be approximately 25 percent wider in diameter than the nominal width of the crack. The backer rod shall be placed to a depth that will provide a shape factor (width to depth of sealant ratio) of approximately 1. Backer rod shall be used when depth of reservoir is greater than ¾ inch.

3.3 CONSTRUCTION METHODS

3.3.1 Preparation of cracks:

Remove existing loose, or damaged HMA concrete, sealant and backing sealant material where applicable. Crack preparation procedures depend on crack size, and existing HMA layer thickness.

Cracks widths from $\frac{1}{4}$ to $\frac{3}{4}$ inch: cracks shall be widened to a nominal width of $\frac{1}{8}$ inch greater than the existing nominal or average width. Widening the cracks $\frac{1}{8}$ inch will help eliminate the potential for raveling of the pavement along the edges of the crack and will provide a sealant reservoir that has vertical faces. The depth of the routed crack should be approximately $\frac{3}{4}$ inch.

Crack widening shall be done by means of concrete router or concrete saw. A vertical spindle router with a diamond bit is recommended to minimize damage to the asphalt pavement; however, an impact router may be used if it is equipped with carbide-tipped vertical-sided bits. Impact routers that are not equipped with carbide-tipped bits or those equipped with V-shaped bits shall not be used. When using a vertical spindle router, the router bit shall be belt-driven to help prevent injury to the operator and damage to the pavement if the bit jams in the crack. If damage to the pavement is observed, work shall be discontinued until corrective action is taken. Such corrective action may require replacing worn router bits, changing operators, or replacing the equipment completely.

When sawing/routing cracks, the reservoir ratio should be 1:1 with a $\frac{1}{2}$ -inch minimum width recommended.

Immediately before sealing, the surfaces shall be thoroughly cleaned of all laitance and other foreign material. Cleaning shall be accomplished by thorough and careful application of HCA heat lance. Upon completion of HCA heat lance application, the exposed surfaces shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps will be used to prepare the cracks for sealing.

3.3.2 Installation of sealant:

The cracks shall be inspected and approved by the APM immediately prior to sealing. Inspections shall include crack reservoir preparation, backer rod size and placement when necessary, and cleanliness of the exposed surface.

When necessary, installation of backer rod shall be continuous with no void spaces at lapped splices and intersections. Sealant shall be applied uniformly solid from bottom to top of crack, and it shall be installed without the formation of entrapped air or voids. The surface of the installed sealant material will be $\frac{1}{4}$ -inch to $\frac{3}{8}$ -inch below the existing pavement surface. A squeegee may be used to remove excess sealant from the pavement surface when a crack is overfilled.

The heating kettle for the hot-applied sealant shall be an indirect heating type, constructed as a double boiler. A positive temperature control and mechanical agitation shall be provided. The joint sealant shall not be heated to more than 200F below the safe heating temperature. The safe heating temperature can be obtained from the manufacturer's shipping container. A direct connecting pressure type extruding device with nozzle shaped for insertion into the joint shall be provided.

Any cracks that are not sealed the same day they are prepared should be blown out with compressed air before the sealing operation continues. If rain delays the sealing operation, the cracks should be allowed to dry and shall be cleaned with HCA heat lance and compressed air free of oil and water.

3.3.3 Installation of HMA patch materials:

For Crack Repair Types 2 and 3: The use of commercial products formulated to fill the crack and remain pliable is desired. Products such as Road Works 306 or equal may be used upon approval of the APM. Follow manufacturer's instructions for preparation and placement of these materials.

3.3.4 Clean-up:

Any sealant spilled on the surface of the HMA pavement shall be removed immediately. Then clean surface of the adjacent HMA pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

3.4 METHOD OF MEASUREMENT

3.4.1

Crack repairs shall be measured by the linear foot of crack repair, measured in place, completed and accepted by the APM.

3.5 BASIS OF PAYMENT

3.5.1

Payment for crack repair shall be made at the contract unit price per linear foot of repair placed. The price shall be full compensation for cleaning, and filling the prepared crack with hot applied sealant, for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the crack repair.

Payment will be made under:

Bid Item 8: Crack Sealing in Asphalt Pavement, per linear foot

END OF SPECIFICATION 3

4 PARTIAL DEPTH PATCH REPAIR OF HMA PAVEMENT

4.1 DESCRIPTION

4.1.1 General Requirements:

The work of this section consists of removal and replacement of distressed, existing Hot Mix Asphalt (HMA) pavement to a required depth, approved by the APM. It includes the removal of existing distressed HMA by saw cutting and/or chipping and/or milling, the preparation of exposed surface, the preparation of patch materials, the installation of patch materials, and all necessary clean-up work and removal of all debris to an off-site location. The patch material hot plant mixed and hot laid. Maximum aggregate size shall be 3/4-inch and the asphalt cement shall be PG 64-10 and shall conform to Section 92, "Asphalt Binders" of the 2025 Caltrans Standard Specification. Asphalt concrete shall be spread and compacted in one or more layers. Each layer of asphalt concrete shall not be less than 2 inches nor more than 4 inches in compacted thickness. Distress types observed and proposed repair depth must be submitted and be approved by the APM.

4.1.2 Submittals:

Prior to beginning work, submit to the APM for approval product data, test reports and certificates of compliance for aggregates and asphalt binder and installation procedures for Aggregates, Bituminous Binder, Job Mix Formula, Tack Coat, And Sealant. Do not begin work until written approvals are given by the APM.

4.2 MATERIALS

4.2.1 Aggregates:

The grading and proportioning of aggregates shall be such that the combined mineral aggregate conforms to the specified requirements.

For Caltrans Mix:

Aggregates for asphalt concrete shall conform to Section 39, "Asphalt Concrete", "39-2 Hot Mix Asphalt" of the 2025 Caltrans Standard Specifications, Type A, for individual test result conforming to 3/4-inch maximum size. Aggregates for base course shall conform to Section 26 of the 2025 Caltrans Standard Specification, Class 2, for 1-1/2-inch maximum size gradation.

For Greenbook Mix:

Aggregates for asphalt concrete shall conform to Part 2 – Construction Materials, Section 200, "Rock Materials", of the Greenbook Standard Specifications for Public works Construction, 2024 Edition, for gradation requirements conforming to 3/4-inch maximum size.

4.2.2 Mineral filler:

If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D 242.

4.2.3 Bituminous binder:

Asphalt binder to be mixed with aggregate shall be a steam-refined paving asphalt in conformance with the provisions in the 2025 Caltrans Standard Specifications Section 92, "Asphalt Binders," and shall be of the grade designated in the special provisions or as approved by the APM.

4.2.4 Tack coat:

Tack coat shall conform to the requirements of ASTM D 2397, or the 2025 Caltrans Standards Specifications Section 94, "Asphaltic Emulsions," for the rapid-setting type, and approved by the APM.

4.2.5 Composition and compaction testing of materials:

The HMA materials shall be considered acceptable for use where plant inspection is maintained by the California DOT and production samples are taken on a regular basis for conformance with California DOT standards based on the approved job mixture formula for maximum size of ¾-inch.

4.3 CONSTRUCTION METHODS

4.3.1 Surface preparation:

Mark the repair area. A string line or straight edge should be used to mark straight lines around the repair area. The lines shall be marked with spray paint so they are easily visible when sawing the pavement. Repair areas shall be marked to form a square or rectangle with at least 12 inches beyond the distressed area.

Saw cut the repair area, with concrete saw equipped with a diamond-tip or abrasive blade. Saw cuts shall overlap so that a vertical and square corner is formed. Since diamond-tip blades usually require water, the repair area should be completely dry before it is repaired. However, there are some types of diamond-tip blades designed to dry cut asphalt pavements. The abrasive saw blade has advantages of lower cost and does not require water when sawing.

Remove existing deteriorated asphalt concrete by milling (for larger repair area) or using jackhammer (for smaller repair area). Pneumatic hammer weight for chipping shall not exceed 30 pounds (to protect adjacent HMA). Make additional saw cuts as needed to speed removal. After milling or jack hammering, remove and discard the loose materials.

Prior to placing new asphalt concrete, the existing aggregate base shall be proof-rolled with heavy construction equipment (e.g. smooth-drum roller) to disclose areas of soft and yielding material. In areas where soft and yielding material is observed, the existing aggregate base shall be removed, the subgrade shall be stabilized, and the aggregate base shall be replaced per Section 2 "Replacement Pavement Construction".

4.3.2 Application of tack coat:

Tack coat shall be applied at the rate of 0.06 to 0.10 gallons per square yard.

4.3.3 Installation of HMA patch:

The material shall be placed and compacted in one lift (maximum 3-inch thickness). In order for the patch to be level with the surrounding pavement, the patch area shall be overfilled (by approximately 40%, depending on the

field test of the mix used) to allow for compaction. The type of compactor shall be compatible and appropriate with the patch size. For small patch areas, a vibratory plate tamper can be used. Larger areas require the use of a steel-wheel roller. Using the appropriate compactor, the patch shall be compacted, starting from the edges, following by the center of the patch area, following direction of traffic. Upon completion of compaction, the patch shall be level or no higher than 1/8 inch above the surrounding patch surface.

4.3.4 Temporary protection of excavation:

Should the patch completion need to be delayed and traffic allowed to pass the excavation shall be covered by steel plates (minimum 1 inch thickness spanning the excavation and fixed in place to prevent movement) rated for H-20 loading.

4.3.5 Saw and seal patch boundary:

After completing the patch, the final step is to saw cut and seal the edges with an appropriate sealant material.

4.3.6 Clean-up:

Clean surface of the adjacent HMA pavements by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

4.4 METHOD OF MEASUREMENT

Partial depth patch repair of HMA pavement shall be measured by the ton (TN) of asphalt concrete, completed and accepted by the APM.

4.5 BASIS OF PAYMENT

4.5.1

Payment for partial depth HMA repair by removal and replacement of HMA layers shall be made at the contract unit price per unit rates for the materials required for the repairs. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the partial depth HMA repair.

Payment will be made under:

- Bid Item 9: Partial Depth Repair, Caltrans Asphalt Concrete, Installed for Non-Airfield Pavements, per ton
- Bid Item 10: Partial Depth Repair, Greenbook Asphalt Concrete, Installed for Non-Airfield Pavements, per ton
- Bid Item 11: Temporary Protection - Steel Plates, per square foot per day of use

END OF SPECIFICATION 4

5 FULL DEPTH PATCH REPAIR OF HMA PAVEMENT

DESCRIPTION

5.1.1 General Requirements:

The work of this Section consists of replacement of distressed, existing Hot Mix Asphalt (HMA) pavement and base layer, to a required depth, approved by the APM. Demolition and subgrade preparation are described in Sections 1 and 2 of this specification. This specification includes the preparation of exposed surface, the preparation of patch materials, the installation of patch materials, and all necessary removals and clean - up work and removal of all debris to an off - site location. The patch material will be the patch material hot plant mixed and hot laid. Maximum aggregate size shall be 3/4-inch and the asphalt cement shall be PG 64-10 and shall conform to Section 92, "Asphalt Binders" of the 2025 Caltrans Standard Specification. Asphalt concrete shall be spread and compacted in one or more layers. Each layer of asphalt concrete shall not be less than 2 inches nor more than 4 inches in compacted thickness. Distress types observed and proposed repair depth must be submitted and be approved by the APM.

5.1.2 Submittals:

Prior to beginning work, submit to the APM for approval product data, test reports and certificates of compliance for aggregates and asphalt binder and installation procedures for Aggregates, Bituminous Binder, Job Mix Formula, Tack Coat, And Sealant. Do not begin work until written approvals are given by the APM.

5.2 MATERIALS

5.2.1 Aggregates:

The grading and proportioning of aggregates shall be such that the combined mineral aggregate conforms to the specified requirements.

For Caltrans Mix:

Aggregates for asphalt concrete shall conform to Section 39, "Asphalt Concrete", "39-2 Hot Mix Asphalt" of the 2025 Caltrans Standard Specifications, Type A, for individual test result conforming to 3/4-inch maximum size. Aggregates for base course shall conform to Section 26 of the 2025 Caltrans Standard Specification, Class 2, for 1-1/2-inch maximum size gradation.

For Greenbook Mix:

Aggregates for asphalt concrete shall conform to Part 2 – Construction Materials, Section 200, "Rock Materials", of the Greenbook Standard Specifications for Public works Construction, 2024 Edition, for gradation requirements conforming to 3/4-inch maximum size.

5.2.2 Mineral filler:

If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D 242.

5.2.3 Bituminous binder:

Asphalt binder to be mixed with aggregate shall be a steam-refined paving asphalt in conformance with the provisions in the 2025 Caltrans Standard Specification Section 92, "Asphalt Binders," and shall be of the grade designated in the special provisions or as approved by the APM.

5.2.4 Tack coat:

Tack coat shall conform to the requirements of ASTM D 2397, or the 2025 Caltrans Standards Specifications Section 94, "Asphaltic Emulsions," for the rapid-setting type, and approved by the APM.

5.2.5 Composition and compaction testing of materials:

The HMA materials shall be considered acceptable for use where plant inspection is maintained by the California DOT and production samples are taken on a regular basis for conformance with California DOT standards based on the approved job mixture formula for maximum size of ¾-inch.

5.3 CONSTRUCTION METHODS

5.3.1 Surface preparation:

Refer to Section 1 of this specification for demolition. Refer to Section 2 "Replacement Pavement Construction" for preparation of subgrade and base.

5.3.2 Application of tack coat:

Tack coat shall be applied at the rate of 0.06 to 0.10 gallons per square yard. Tack coat shall be applied to the exposed edges and surfaces against which asphalt concrete it to be placed. Before application of tack coat, the surface shall be cleaned with a stiff broom and, if necessary, with compressed air to remove all deleterious and loose material.

5.3.3 Installation of HMA patch:

The material shall be placed and compacted in one lift (maximum 3-inch thickness) or multiple 2-inch lifts. In order for the patch to be level with the surrounding pavement, the patch area shall be overfilled (by approximately 40%, depending on the field test of the mix used) to allow for compaction. The type of compactor shall be compatible and appropriate with the patch size. For small patch areas, a vibratory plate tamper can be used. Larger areas require the use of a steel-wheel roller. Using the appropriate compactor, the patch shall be compacted, starting from the edges, following by the center of the patch area, following direction of traffic. Upon completion of compaction, the patch shall be level or no higher than 1/8 inch above the surrounding patch surface.

5.3.4 Temporary protection of excavation:

Should the patch completion be delayed, and traffic allowed to pass the excavation shall be covered by steel plates (minimum 1 inch thickness spanning the excavation and fixed in place to prevent movement).

5.3.5 Saw and seal patch boundary:

After completing the patch, the final step is to saw-cut and seal the edges with appropriate sealant material.

5.3.6 Clean-up:

Clean surface of the adjacent HMA pavements by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

5.4 METHOD OF MEASUREMENT

5.4.1

The full depth HMA repair by removal and replacement of HMA layer and base shall be measured by the square feet of repair surface areas and the thicknesses and weights of materials as appropriate, completed and accepted by the APM.

5.5 BASIS OF PAYMENT

5.5.1

Payment for full depth HMA repair by removal and replacement of HMA layers and base shall be made at the contract unit prices necessary to complete the patch. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, and placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the full depth HMA Repair.

Payment will be made under:

- Bid Item 12: Caltrans Asphalt Concrete, Installed for Non-Airfield Pavements, per ton
- Bid Item 13: Greenbook Asphalt Concrete, Installed for Non-Airfield Pavements, per ton
- Bid Item 26: Aggregate Base in Place, per cubic yard

END OF SPECIFICATION 5

6 ASPHALT CONCRETE OVERLAY - FOR VEHICULAR TRAFFIC

6.1 GENERAL

6.1.1 Applicable publications:

The following publications of the issues listed below, but referred to hereinafter by basic designation only, form a part of this specification to the extent required by the references thereto:

6.1.2 U.S. Department of Commerce standards:

PS20-05, American Softwood Lumber Standard.

6.1.3 State of California Department of Transportation:

Standard Specification, Section 39, "Asphalt Concrete" (2025, or Latest Edition) Whenever this specification is referenced, the following is understood:

- A. All references to statistical testing are deleted.
- B. Whenever a discrepancy occurs between the Standard Specification and this specification, it is understood that this specification governs.
- C. All references to measurement and payment are deleted.

6.1.4 American society for testing & materials (ASTM) publications (Latest Editions):

C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
D1556	Standard Test Method for Density and Unit Weight for Soil In-Place by the Sand-Cone Method
D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soils Using Modified Effort
D6398	Standard Test Method for In-Place Density and Water Content for Soils and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D2172	Standard Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

6.1.5 Submittals:

Preparation of mix design, sampling and testing of materials and equipment for compliance with the specifications shall be performed by an approved independent commercial testing laboratory (approved by APM) at the expense of the Contractor. All samples and tests specified for the conformance and quality control shall be taken to correctly reflect the construction work. Certified copies of all tests shall be delivered to the APM. Test methods shall be in accordance with procedures of the applicable publications.

6.1.6 Certificates:

Notarized manufacturer's certificate of compliance shall be submitted for the following:

1. asphalt cement
2. liquid asphalt
3. asphalt emulsion

6.1.7 Sampling:

After Contractor has selected and designated the source of any proposed materials, the Contractor shall visit the source and determine if the source has adequate supply of material for the project needs, shall secure samples and arrange for the specified testing for each separate source before such materials are required for use in the work. Sampling of asphalt concrete aggregates and bituminous materials shall be accomplished in accordance with methods of the Standard Specifications.

6.1.8 Suitability tests of proposed materials:

Tests for conformance with the specifications shall be performed in accordance with Table 1 and Note 1 presented in Section 6-3.9.6. The samples shall be identified to show the name of the material, aggregate source, name of the supplier, contract number and the segment of the work where the material represented by the sample is to be used. Results of all tests shall be submitted.

6.1.9 Mix design:

Mix design shall be submitted by the Contractor prior to placing of the bituminous mixture. The design shall be prepared by the Contractor's laboratory and shall conform to the requirements of the Standard Specification. The design shall include test results of the aggregates and proposed batch plant weights and shall be within the specified limits.

6.2 MATERIALS

6.2.1 Aggregates:

The grading and proportioning of aggregates shall be such that the combined mineral aggregate conforms to the specified requirements. Aggregates for asphalt concrete shall conform to Section 39, "Asphalt Concrete" of the 2025 Caltrans Standard Specification, Type B, for individual test result conforming to 1/2-inch maximum size, medium gradation. Aggregates for base course shall conform to Section 26, "Aggregate Bases" of the 2025 Caltrans Standard Specification, Class 2, for 1-1/2-inch maximum size gradation.

6.2.2 Asphalt materials:

6.2.2.1 Asphalt cement:

(Binder) shall be, PG 64-10, unless otherwise indicated on the plans, and shall conform to Section 92, "Asphalt Binders" of the 2025 Caltrans Standard Specification.

6.2.2.2 Liquid asphalt:

(Prime Coat), MC-70, shall conform to Section 92, “Asphalt Binders” of the 2025 Caltrans Standard Specification.

6.2.2.3 Base course:

One day before the application or placement of bituminous materials, the surface shall be sterilized with herbicide.

6.3 CONSTRUCTION METHODS

6.3.1 Surface preparation:

Existing pavement may be overlaid with a compacted 2-inch minimum layer of new asphalt concrete pavement provided new grade is met and not exceeded. Existing pavement that is to be overlaid shall be cleaned and all pavement defects patched as provided for in this section. Adjust to finished grade all manhole covers, junction boxes, catch basin grades, monument frames, valve boxes and other existing utility covers as required within the work area to conform and other existing utility covers as required within the work area to conform with Section 15, “Existing Facilities” of the 2025 Caltrans Standard Specifications. If ordered by the APM, a surfacing mixture shall be placed to level irregularities, dips, depressions, and sags to provide a smooth base of uniform grade and cross-section conforming to existing drainage patterns. The use of pavement reinforcing fabric must be approved by the APM.

6.3.2 Crack repairs:

Cracks that are visible after milling shall be filled and sealed prior to placement of the asphalt overlay. Refer to Section 3 “Sealing Crack in HMA Pavements” of this specification.

6.3.3 Patch repairs:

Refer to Section 4 (Partial Depth Patch of HMA Pavement) or 5 (Full Depth Patch of HMA Pavement) of this specification.

6.3.4 Prime coat:

Prior to the application of the asphalt concrete, a bituminous prime coat of liquid asphalt shall be applied on the surface of aggregate base or re-compacted base in accordance with Section 39, “Asphalt Concrete” of the 2025 Caltrans Standard Specification. Liquid asphalt shall be applied by pressure distributors. Sufficient time shall be allowed before placing asphalt concrete surfacing to permit the prime coat asphalt to penetrate the base.

6.3.5 Tack coat:

Asphalt emulsion shall be applied in accordance with Section 39 and Section 94 of the 2025 Caltrans Standard Specifications to the existing pavements surfaces at a rate of 0.10 gallons per square yard and to the exposed edges and surfaces against which asphalt concrete is to be placed. Before application of tack coat, the surface shall be cleaned with a stiff broom and, if necessary, with compressed air to remove all deleterious and loose material.

6.4 ASPHALT CONCRETE

6.4.1 Contractor furnished:

All materials shall be furnished by the Contractor. The bituminous concrete used in reconstructing or overlaying pavements shall consist of mineral aggregate uniformly mixed with 5 to 7 percent, by weight, asphalt cement binder bituminous material in a central plant. The mixing of materials, the mixing plant, and construction equipment shall be in accordance with Section 39, "Asphalt Concrete" of the 2025 Caltrans Standard Specification.

6.4.2 Placing:

Bituminous mixtures shall be delivered to the roadbed at temperatures specified in the Standard Specification. Spreading of the mixture shall be in accordance with the Standard Specification. Tarpaulin shall be furnished at the Contractor's expense and used to cover all loads during transportation.

6.4.3 Compaction:

Initial or breakdown rolling and the final rolling of the uppermost layer of the asphalt concrete shall be compacted in accordance with Section 39, "Asphalt Concrete" of the 2025 Caltrans Standard Specification. Compaction by vehicular traffic shall not be permitted.

6.4.4 Jointing pavement:

The joints between old and new pavements or between successive days work shall be carefully made in such manner as to ensure a continuous bond between old and new sections of the course. Edges of existing pavement shall be exposed and cleaned, and edges saw cut to straight, vertical surfaces. All joints shall be painted with a uniform coat of paint binder (tack coat) before the fresh mixture is placed. Joints in the new pavement shall be prepared in accordance with Section 39 of the Standard Specification.

6.4.5 Protection of pavement:

After final rolling, no vehicular traffic of any kind shall be permitted on pavement until it has cooled and hardened and in no case less than 6 hours.

6.4.6 Headerboards:

Where indicated, boards shall be 2" X 4" secured in place using adequately sized stakes spaced not more than 6 feet apart. All forms shall be set to true alignment and grade. Headerboard and stakes shall be either redwood (rough sawn construction, heart grade), Western Red Cedar or pressure treated Douglas Fir at the Contractor's option, conforming to U.S. Department of Commerce Standard PS20. Untreated headerboards shall be stored to prevent warping. Soil shall be placed against the outside shoulder of forms and compacted sufficiently to prevent forms from spreading during the compaction of the pavements.

6.4.7 Extruded asphalt curbs:

Extruded asphalt curbs shall be replaced with 6 inches high by 6 inches top and 8 inches bottom curbs and shall be fastened to the existing asphalt concrete pavement by epoxy cement.

6.5 FIELD TESTS

6.5.1 Sampling and testing:

At random locations at the job site suitable sized sample of bituminous pavement mixture and compacted pavement shall be sampled and tested in accordance with Table 1, except Note 1. The Contractor shall replace the materials at their expense.

Job-mix test: Samples of the plant mixtures shall be tested to determine gradation and bitumen content in accordance with ASTM D2172. Gradation shall be performed in accordance with ASTM C136. Lay-down variations from the job mix formula shall not exceed the following:Aggregate Size	Tolerance
1/2-inch or larger	+/- 8 percent
3/8 inch to No.4	+/- 7 percent
No. 8 and No. 16	+/- 6 percent
No. 30 and No. 50	+/- 5 percent
No. 100	+/- 4 percent
No. 200	+/- 2 percent

The bitumen ratio (pounds of asphalt per 100 pounds of dry aggregate including supplemental fine aggregate if used) shall not vary by more than 0.5-pound of asphalt above or 0.5-pound of asphalt below the amount specified in the Job Mix (0.05% by weight). When required, the Contractor shall make all necessary corrections to the bituminous proportions to conform to the specified requirements.

6.5.2 Smoothness:

The wearing course and binder course or any single course shall be tested in accordance with Section 39, "Asphalt Concrete" of the 2025 Caltrans Standard Specifications in the presence of the APM.

6.5.3 Thickness test:

The thickness of each layer of compacted asphalt concrete shall be measured at intervals such that there will be not less than one test for each 1000 square yards of pavement surface or fraction thereof. The depth measurements shall be made by test cores not less than 3 inches in diameter through the compacted material. The Contractor shall replace and compact the materials at their own expense.

6.5.4 Inspection of plant and equipment:

The APM shall have access at all times to all parts of the paving plant for checking the adequacy of the equipment in use, checking calibration of equipment, inspecting the operation of the plant, verifying weight, proportions and character of materials and checking temperatures being maintained in the preparation of the mixtures.

6.5.5 Frequency of tests:

The minimum number and type of tests shall be in accordance with Table 1. Sampling and testing of materials and equipment for compliance with the specifications shall be performed by an approved independent commercial testing laboratory (approved by APM) at the expense of the Contractor. The Contractor shall not be limited by the minimum number of tests shown in Table 1 and shall require additional tests at the Contractor's expense as he deems necessary to determine compliance with the minimum requirements of the contract.

TABLE 1

MATERIAL	TEST FOR	TEST METHOD	FREQUENCY
Aggregates	Gradation, each size	Ca. 202	Note (1)
	Filler, composition	Ca. 202	Note (1)
	% of Crushed Particles	Ca. 205	Note (2)
	LA Rattler (500 Rev.)	Ca. 211	Note (2)
	Sand Equivalent	Ca. 217	Note (1)
Mix Design	Stabilometer Value	Ca. 366	Note (1)
	Moisture Vapor Susceptibility	Ca. 307	Note (2)
	Swell	Ca. 305	Note (2)
Laydown	Extraction Test and Gradation	ASTM D2172 & Ca. 202	Note (3)
Completed	Smoothness	Section 39	Note (4)

NOTES:

- (4) At least one complete set of tests before start of job.
- (4) Test reports during last 12 months from a laboratory acceptable at start of job.
- (4) One test for each 800 tons placed.
- (4) Continuous inspection for compliance and one surface test for each 2000 square yards of surface area.

6.6 EVALUATION

6.6.1

The asphalt pavement shall be sampled, tested, and accepted by a test lot, which shall not exceed 800 tons of asphalt concrete. The materials shall be sampled either at the plant or job site. The location of tests shall be randomly selected by the APM using a table of random numbers.

6.6.2

Acceptance of asphalt concrete shall be determined by the average results of two (2) samples taken from a test lot. A lot shall be deemed acceptable when the average of the results obtained from two (2) samples fall within the following process tolerances permitted for deviation from the job-mix formula.

Sand Equivalent	+/- 3 percent
Stabilimeter Value	+/- 4 percent
Moisture Vapor Susceptibility	+/- 2 percent
Swell	+/- 0.002 inch

6.7 METHOD OF MEASUREMENT

6.7.1

Preparation and placement of asphalt concrete overlay pavement shall be measured by the ton (TN), completed and accepted by the APM.

6.8 BASIS OF PAYMENT

6.8.1

Payment for asphalt concrete overlay shall be made at the contract unit prices necessary to complete the work. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment will be made under:

- Bid Item 8: Sealing Cracks in Asphalt Pavements, per linear foot
- Bid Item 12: Caltrans Asphalt Concrete, Installed for Non-Airfield Pavements, per ton
- Bid Item 13: Greenbook Asphalt Concrete, Installed for Non-Airfield Pavements, per ton
- Bid Item 18: Raise or Lower Covers, Frames, or Grates of Existing Manholes & Storm Inlets to Grade, per each
- Bid Item 14: AC Curb installed, per linear foot

END OF SPECIFICATION 6

7 ASPHALT SLURRY SEAL

7.1 DESCRIPTION

7.1.1 General Requirement:

This section covers requirements for asphalt slurry seal, prime coat, tack coat, weed control, patch and crack repairs for vehicular streets, roads, and parking areas. The methods of construction shall be as specified herein.

7.1.2 Applicable publications:

The following publications of the issues listed but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto:

7.1.3 State of California Department of Transportation:

Standard Specification, Section 37-3 “Slurry Seals and Micro-Surfacings” (2025 or Latest Edition) Whenever this specification is referenced, the following is understood:

1. All references to statistical testing are deleted.
2. Whenever a discrepancy occurs between the Standard Specification and this specification, it is understood that this specification governs.
3. All references to measurement and payment are deleted.

7.1.4 American Society for Testing and Material (ASTM) Publications (Latest Editions):

C117	Standard Test Method for Material Finer Than No. 200 Sieve in Mineral Aggregates by Washing
C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
D977	Standard Specification for Emulsified Asphalt
D2172	Standard Test Method Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
D2397	Standard Specification for Cationic Emulsified Asphalt
D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregates
D3910	Standard Practices for Design, Testing, and Construction of Slurry Seal

7.1.5 Submittals:

Certified test reports are required for the following:

Percentage of wear test shall be performed in accordance with ASTM C131. Wet track abrasion test will be performed in accordance with ASTM D3910. Sand equivalent test will be performed in accordance with ASTM D2419.

The asphalt emulsion test shall be performed on the materials to be used in the project within 30 days of submittal of the reports for approval.

7.1.6 Job mix formula:

A job mix formula shall be submitted and approved. The formula shall indicate the type and quantity of asphalt emulsion, the residual asphalt content, the water content, aggregate type and gradation, rate of application, and the abrasion loss from the wet track abrasion test. Samples of materials to be used on the job shall be used to determine the job mix.

7.1.7 Equipment:

Descriptive information on the slurry mixing and application equipment to be used shall be submitted for approval not less than 21 days prior to commencement of work.

7.1.8 Delivery and storage:

Materials shall be delivered and maintained in an undamaged condition. Aggregates shall be stockpiled as to preclude contamination and segregation.

7.1.9 Weather limitations:

The slurry seal shall be applied only when the existing surface is clean and free of visible moisture. Slurry seal shall be applied only when the pavement is above 50 degrees F, and the atmospheric temperature is at least 50 degrees F and rising. (An effective means of measuring pavement temperature is obtained by filling a crack or small drill hole in the pavement with water, which is allowed to stand for 15 minutes, then inserting a thermometer and reading the temperature.) Slurry seal with anionic emulsion shall not be applied if rainfall is forecast at a 40% or greater probability for the next eight hours or if air temperatures below 35 degrees F are predicted for the next 72 hours. Slurry seal with cationic or quick-set emulsion shall not be applied if rainfall is forecast for the next four hours or if air temperatures below 35 degrees F are predicted for the next 24 hours.

7.2 MATERIAL

7.2.1 Aggregate:

Aggregates shall consist of sound durable crushed stone or crushed gravel, and approved mineral filler, and shall be free from dirt, organic matter, clay balls, adherent films of clay, dust, and other objectionable matter. Aggregates shall be 100 percent crushed. The grading of the aggregate shall conform to the following requirements.

TYPE I

Sieve Size	Percent Passing
No. 4	100
No. 8	90-100
No. 16	65-90
No. 30	40-60
No. 50	25-42
No. 100	15-30
No. 200	10-20

The gradation shall be determined in accordance with ASTM C136 and ASTM C117. The maximum percentage of wear shall be not more than 35 percent when tested in accordance with ASTM C131, Grading D. When tested in accordance with ASTM D2419, the aggregate, excluding the mineral filler, shall have a sand equivalent of not less than 45 excepting that the minimum sand equivalent shall be 60 when used with a cationic emulsion.

7.2.2 Mineral filler:

Mineral fillers shall be Portland cement or hydrated lime and conform to the requirements of ASTM D242.

7.2.3 Emulsified asphalt:

Emulsified asphalt shall conform to Section 94 "Asphaltic Emulsions" of the 2025 Caltrans Standard Specification.

7.2.4 Water:

Potable.

7.2.5 Emulsified asphalt slurry mixture:

The asphalt emulsion content and aggregate weight per square yard shall conform to the following requirements.

TYPE I

Asphalt Emulsion Content 18 ± 3
Percent of Aggregate
by Weight

Pounds of aggregate per 8 ± 1.2
square yard

The slurry mixture shall be composed of a mixture of asphalt emulsion, aggregate, mineral filler, and water within the ranges indicated. The amount of emulsified asphalt shall be determined by trial laboratory mixes and the wet track abrasion test results. If the amounts used are more or less than the specified range, an adjustment in the contract price will be made as provided in the

Contract Clauses. The aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula. The combined aggregate and filler shall be graded smoothly and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve. The slurry seal mixture shall have the following additional characteristics:

7.2.6 Resistance to abrasion:

The allowable wear of the cured slurry mix shall not exceed 75 grams per square foot when tested for wet track abrasion in accordance with ASTM D3910. The cured slurry being tested shall not pick up on the roller of the apparatus.

7.2.7 Fluidity:

The slurry seal mixture shall contain the minimum amount of water necessary to obtain a fluid and homogeneous mixture.

7.2.8 Non-segregation:

The mixture shall not segregate during or after application to the pavement.

7.2.9 Surface texture:

The mixture shall have a non-skid texture.

7.3 CONSTRUCTION METHODS

7.3.1 Construction Equipment:

7.3.1.1 Equipment:

The equipment used in the performance of the work shall be approved and shall be always maintained in satisfactory working condition. APM reserves the right to order the discontinuation of the use of any equipment that fails to produce satisfactory work.

7.3.1.2 Mixer:

The slurry mixing machine shall be a continuous flow mixing unit and be capable of delivering accurately a pre-determined proportion of aggregate, water and emulsified asphalt to the mixing chamber and to discharge the thoroughly mixed product on a continuous basis. The aggregate shall be pre-wetted immediately prior to mixing with the emulsified asphalt. The mixing unit of the mixing chamber shall be capable of thoroughly blending all ingredients together. The mixing machine shall be equipped with an approved fines feeder that provides a method to accurately introduce a predetermined proportion of mineral filler at the same time and locations that the aggregate is fed into the mixer. The fines feeder should be used whenever added mineral filler is a part of the aggregate blend. The mixing machine shall be equipped with a water pressure system and fog type spray bar

adequate for complete fogging of the surface ahead of the spreading equipment with an application up to 0.05 gallon per square yard. Sufficient machine storage capacity to mix properly and apply a minimum of 5 tons of slurry shall be provided. Proportioning devices shall be calibrated prior to placing slurry seal.

7.3.1.3 Self-contained slurry machine:

The machine shall be capable of rapid discharge of the mixed materials into a spreader having suitable controls to allow adjustment for variations in pavement grades and slope. The spreader shall be like the spreader box as hereinafter specified. The spreader box may be either an integral part of self-contained slurry machine or a separate towed unit. The self-contained slurry unit shall be mounted on a truck or other vehicle capable of producing evenly controlled low rates of spread throughout the operation so that the slurry is spread evenly and all cracks are filled.

7.3.1.4 Slurry spreading equipment:

Attached to the mixer machine shall be a mechanical type of squeegee distributor equipped with flexible material in contact with the surface to prevent loss of slurry on varying grades and crown by adjustment to assure uniform spread. There should be a lateral control device and a flexible strike-off. The spreader box shall have an adjustable width. The box shall be kept clean, and build-up of asphalt and aggregate on the box shall not be permitted. The use and condition of burlap drags, or other drags shall be approved by the APM (herein also known as APM).

7.3.1.5 Traffic paint removal equipment:

Shall be specifically designed for traffic paint removal and shall be a self-propelled machine using a cutting head assembly with steel cutters or a self-propelled machine using a cutting head assembly with a series of abrasive saw blades.

7.3.1.6 Cleaning equipment:

Power brooms, power blowers, air compressors, water flushing equipment, and hand brooms shall be suitable for cleaning the surface and cracks of the old surface.

7.3.1.7 Hand tools:

Hand squeegees, shovels, hand burlap drags, and other equipment shall be available as necessary to perform the work.

7.3.2 Construction Procedure:

7.3.2.1 Weed control:

Refer to Section 12 of this specification – Methacrylate.

7.3.2.2 Crack repairs:

Cracks shall be repaired as specified in section 3, “Sealing Crack in HMA Pavement.”

7.3.2.3 Preparation of surface:

Immediately prior to applying the tack coat, remove all vegetation and clean the surface of all loose or objectionable material. Any Standard cleaning method used to clean pavements will be acceptable, except that water flushing will not be permitted in areas where considerable cracks are present in the pavement surface. Remove and repair areas of pavement impregnated with grease, oil or fuel. Scrub surface oil and grease thoroughly with an approved detergent and water and flush the surface clean of the detergent. Water-flushed areas shall be swept free of puddles. Surface cracks shall be cleaned and blown out with compressed air (90 psi at the nozzle) immediately before sweeping or vacuum operations.

7.3.2.4 Mixing of slurry:

The mixing of slurry shall be sufficient to produce a uniform mixture of the desired consistency in accordance with the job mix formula. Under no circumstances shall the emulsion content be changed to control the consistency of the mix. If breaching, hardening, segregation, balling, or lumping occurs during the mixing process, the batch shall be discarded.

7.3.2.5 Application of slurry seal:

Slurry mix shall not be applied during periods of low temperature or pending rainfall previously specified. The surface shall be fogged with water directly preceding the spreader. The slurry mixture shall be of the desired consistency when deposited on the surface, and no additional elements shall be added. The water content shall be controlled and be in accordance with the job mix formula. A sufficient amount of slurry shall be always carried in all parts of the spreader so that complete coverage is obtained. No segregation of the emulsion and aggregate fines from the course shall be left in the finished surface. No excessive build-up or unsightly appearance shall be permitted on longitudinal or transverse joints. Hand burlap dragging shall be used to spread slurry in areas inaccessible to the slurry mixer. Care shall be exercised to leave no unsightly appearance from hand work. Burlap drags suitable to even the surface and leave a rough texture of slurry application shall be used. Slurry seals shall be cured for at least 4 hours after that traffic may resume if permitted by the APM. Suitable methods such as barricades, flagmen, pilot cars, etc., shall be used to protect the uncured slurry surface for all type of traffic. The Contractor shall provide temporary making to delineate traffic lanes until permanent striping is applied.

7.3.2.6 Removal of barricades:

Barricades shall not be removed until the final slurry sealed surface has been approved by the APM.

7.3.2.7 Sampling:

Method of sampling aggregates shall be in accordance with ASTM D75. Methods of sampling bituminous material shall be in accordance with ASTM D140.

7.3.2.8 Sampling aggregates:

At least one initial sample shall be taken from each stockpile. Each sample shall be collected by taking incremental samples at random from the source material to make a composite sample of not less than 50 pounds. Three random samples shall be taken from each 200 tons of material, or a day's run thereafter, during the project. Each random sample shall be made when the source of material is changed or when variations in gradation exceeding that hereafter specified are found in testing.

7.3.2.9 Sampling bituminous material:

The asphalt emulsion shall be sampled immediately after delivery to the project site and at any time thereafter if the source of material is changed. Additional samples shall be taken directly from the emulsion storage tanks of the slurry seal machine when so directed.

7.3.2.10 Sampling slurry mix:

Samples of the slurry seal mixture shall be taken at the rate of at least two samples per day from each slurry seal machine used on the project. Samples shall be taken in clean plastic containers at the diverter after the slurry machine has traversed sufficient distance to be provided with a uniform mixture. Each sample shall be immediately capped and marked for identification.

7.3.2.11 Sample identification:

Each sample of aggregate, emulsion, and slurry mixture shall be placed in a clean container, which shall be securely fastened to prevent loss of material. Each sample shall be identified with the following information:

1. Contract Number
2. Sample Number
3. Date of Sample
4. Sample
5. Source
6. Intended Use
7. For Testing

7.3.3 TESTING

7.3.3.1 Aggregates:

Each aggregate sample shall be tested for gradation in accordance with ASTM C117 and ASTM C136. Additional tests for Los Angeles abrasion and sand equivalent shall be conducted whenever the aggregate source job is changed or when otherwise directed.

7.3.3.2 Bituminous materials:

Each sample of asphalt emulsion shall be tested for conformance Guard top specifications or to ASTM D977 for the anionic type and ASTM D2397 for the cationic type if an approved equal is used. Tests on asphalt emulsions shall include determination of residual asphalt content.

7.3.3.3 Slurry mixture:

Each sample of slurry mixture shall be tested for conformance to the job mix formula. The following tests shall be performed:

1. Water content as percentage of dry weight of slurry before extraction.
2. Residual asphalt content as percent of dry weight of aggregate shall be determined in accordance with ASTM D2172.
3. Gradation of extracted aggregate shall be determined in accordance with ASTM C136.
4. Percent of emulsified asphalt in slurry mixture based on weight of dry aggregates should be calculated.

7.3.3.4 Variation:

Variations from the approval job mix formula shall not exceed the following.

Aggregate Size	Tolerance (plus or minus)
3/8-inch to No. 4	7 percent
No. 8 and No. 16	6 percent
No. 30 and No. 50	5 percent
No. 100	4 percent
No. 200	2 percent
Asphalt Emulsion	1 percent
Water Content	1 percent

7.3.3.5 Trial application:

The Contractor shall place a test strip of at least 60 square yards in area designated by the APM. The test section shall be placed using the same equipment and methods as will be used in the job. Slurry mixture placed in test strip shall conform to job mix. The Contractor shall also demonstrate that their equipment has been properly calibrated and is clean and in good working order. Work shall not proceed prior to approval of the test strip.

7.3.3.6 Dust Cap Slurry Seal:

Dust Cap Slurry Seal shall meet Section 7-3.7 or APM's approved equal.

7.3.3.7 Pave guard:

Pave guard is a single package, water dispersed, mineral filled, black cementitious asphalt coating with inorganic mineral and organic polymer chemistry.

Pave guard properties are:

1. Adhesive binder shall be a composite rubber modified asphalt containing a minimum 5% by weight (expressed as a percentage of the combined neat asphalt and tire mass) of a uniformly embedded recycled tire. The recycled tire fragments shall have tension, compression and elastic characteristics similar to whole, recyclable tires consisting of a maximum particle size of 180 microns (80 mesh).do
2. Solids content: 48% Minimum (summer), 52% Min. (cool weather/high traffic areas/airports), free of bacterium food source such as wood fiber.
3. Biocide content: None (no formaldehyde or other biocides are present in the basic stock formula

7.3.3.8 Physical properties for Pave guard:

PROPERTY	MIN	MAX	METHOD
Bulk Density (lbs. per gallon)	9.5	10.0	ASTM D-1475
Water Absorption	< 4%		ASTM D-570
Percent Solids	48%	52%	ASTM D-3960
Biocide Content	NONE		
Wet Track Abrasion (6 Day)	< 35 grams/S.F.		ISSA A-105, T-100, ASTM 3910
VOC	< 10 grams/liter		BAAQMD Vol. 3 Lab 22
Settlement	< 1%		
Viscosity (CPS)	800	1700	ASTM D 2196-86
FuelResistance (w/FR additive)*	Pass		ASTM D 2939, RP-355e
Flexibility - Will Not Crack	180° Arc (60 mils) 4°C		ASTM A 105 No. 146
Softening Point (adhesive)	>120 F		ASTM D 36-95

*when specified by APM

7.3.3.9 Lightweight equipment:

Pavement thickness in dust cap areas requires the use of lightweight equipment only. The equipment used in the performance of the work shall be approved by the APM prior to operation. APM reserves the right to order the discontinuance of the use of any equipment that fails to produce satisfactory work.

7.3.3.10 Application:

Application down to 75°F by proprietary spray hardware or standard squeegee equipment at spread rates of 0.15-0.30 gal/yd² is performed after a typical field dilution of 5-20%. Excessive field dilution should be avoided as it will lead to adhesive flushing and premature failure.

7.4 BASIS OF PAYMENT

7.4.1

The price shall be full compensation for furnishing all materials and for all preparation, hauling, disposal, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete the bid item.

Payment will be made under:

Bid Item 15: Slurry Seal Coat, per square yard

Bid Item 16: Dust Cap Slurry Seal, per square yard

END OF SPECIFICATION 7

8 MODIFIED ASPHALT SLURRIES

8.1 DESCRIPTION

8.1.1 General Requirements:

This work shall consist of formulating a mix design, cleaning pavement surfaces, mixing and applying a crumb rubber asphalt slurry-seal surface treatment, and protecting the completed slurry seal until set. All work shall be in accordance with this specification, the dimensions, and details shown on the plans, and as approved by the APM.

8.1.2 Applicable publications:

The following publication listed below but referred to hereafter by basic designation “Greenbook” only, form a part of this specification to the extent required by the references thereto: American Public works Association, Standard Specification for Public Works Construction, “Greenbook” (2024 or Latest Edition).

8.1.3 Quality Requirements:

Manufacturers shall certify that materials meet the following requirements:

TABLE 4-3.2.4 (A)

TESTS ON RUBBERIZED POLYMER MODIFIED EMULSION

Viscosity, 25°C (77°F), Brookfield, Model RVT #6	2,500 min.
Spindle @ 10 RPM (Centipoise)	20,000 max.
Residue by Evaporation % ASTM D 244	50 min.
Sieve Test % retained on No. 20 screen ASTM D 244	2.0 max. ¹
Weight per Liter (Gallons)	1.0 kg/L (8.33 lbs/gal) min. 1.05 kg/L (8.75 lbs/gal) max.
Penetration of Residue, 25°C (77°F), 100 g. 5 sec. ASTM D 5	20 min. - 40 max.
Percent Residue Soluble in Trichloroethylene ASTM D 2042	75 min.

¹Sieve test of original emulsion is 0.10 max.

TABLE 4-3.2.4 (B)
TEST ON POLYMER MODIFIER

Total Solids (residue)	ASTM D1417	60% min.

TABLE 4-3.2.4 (C)
COMPOSITION OF REAS

Aggregate Type	RPME % of Dry Aggregate Weight	Residual RPME % of Dry Aggregate Weight	kg of Dry Aggregate per Liter of RPME	Pounds of Dry Aggregate per Gallon of RPME
Fine Slurry Aggregate	60-80	30-40	1.27-1.70	10.6-14.2
Type I Slurry Aggregate	50-75	25-38	1.35-2.00	11.3-17.0

8.1.4 Mix Design Submittal:

Mix designs and calibration shall be per 302-4.2 of Greenbook and the following. Mix design results shall include any proposed additives. The completed slurry shall have a minimum skid resistance of 40 when tested per California Test No. 342. The standard Wet Track Abrasion Test (WTAT) template may be modified to a thickness of 3.18 mm (0.125 in), when using slow-set emulsion. The mix design shall include the weight per liter (weight per gallon) of REAS.

8.1.5 Mix designs and certifications:

Mix designs for CRUMAC shall conform to 203-11.6 of Greenbook. Once the percent asphalt rubber binder is determined by the mix design, the production tolerance shall be $\pm 0.5\%$ as determined by California Test Method 382.

8.2 MATERIALS

8.2.1 Rubberized Emulsion:

Aggregate Slurry (REAS) shall consist of Rubberized Polymer Modified Emulsion (RPME) and aggregate. Materials for REAS shall conform to the following, immediately prior to mixing.

8.2.2 Rubberized polymer modified emulsion:

The RPME shall be a slow-set or a quick-set type of emulsion as determined by the APM. RPME shall contain asphalt, crumb rubber, and polymer modifiers.

8.2.3 Polymer modifier:

Polymer modifier shall be latex which is added at a minimum of 2 percent by weight of the RPME.

8.2.4 Crumb Rubber:

The material shall be granulated scrap tire rubber free from fabric wires and other contaminants. Rubber shall be dry and free flowing. Calcium carbonate or talc may be added to a maximum of 4 percent by weight of rubber to prevent rubber particles from sticking together. The rubber shall have a specific gravity between 1.15 and 1.20 one hundred percent of the rubberized material shall pass a 1.18 mm (No. 16) sieve, 95 percent shall pass a 900 μ m (No. 20) sieve, and a maximum of 2 percent shall pass a 75 μ m (No. 200) sieve. The RPME shall contain between 66 g/L (0.55 lbs/gal) and 78 g/L (0.65 lbs/gal) of crumb rubber.

8.2.5 Aggregate:

The aggregate shall consist of sound and durable natural or manufactured sand, crushed stone, or crushed stone and rock dust, or a combination thereof, free of deleterious amounts of organic material, mica, and other substances not suitable for the purpose. Smooth- textured sand of less than 1.25 percent water absorption, as tested by ASTM C 128, shall not exceed 50 percent of the total combined aggregate. Aggregate retained on the 300 μ m sieve (No. 50) shall be 100 percent crushed.

The combined aggregate shall meet the requirements of Table 200-1.71 of Greenbook prior to any chemical additions.

The combined aggregate shall conform to the gradation shown in Table 23.2.5(A) when tested in accordance with ASTM C 136.

TABLE 23.2.5 (A)
GRADATION OF AGGREGATES

Sieve Size	% By Weight Passing Sieves	
	Fine Slurry Aggregate	Type I Slurry Aggregate
4.75 mm (No. 4)	100	100
2.36 mm (No. 8)	95-100	90-100
1.18 mm (No. 16)	75-92	65-90
4 μ m (No. 30)	50-75	40-60
300 μ m (No. 50)	35-50	25-42
150 μ m (No. 100)	15-30	15-30
75 μ m (No. 200)	10-20	10-20

8.2.6 Water:

All water used in making the slurry shall be potable and free from harmful soluble salts.

8.2.7 Additives:

Additives up to 1.5 percent of the dry aggregate weight, as approved in the mix design, may be used in the slurry to modify viscosity, setting, and curing characteristics, Field adjustments to additives may be made only if approved by the APM.

8.2.8 Asphalt rubber:

Asphalt Rubber shall consist of Paving Grade Asphalt per 203-1 of Greenbook and CRM. The proportions of the two materials, by weight, shall be 82 ± 2 percent paving asphalt and 18 ± 2 percent CRM.

8.2.9 Crumb rubber modifier (CRM):

CRM shall be scrap tire CRM as required in 203-11.2.3 of Greenbook. Gradation of the CRM shall be per Table 4-4.2.2(A).

TABLE 4-4.2.2 (A)
CRUMB RUBBER GRADATION.

SIEVE SIZE	PERCENT PASSING (by weight)	TOLERANCE
2.00 mm (No. 10)	100	-
1.18 mm (No. 18)	40-60	$\pm 10\%$
4 μ m (No. 30)	10-20	$\pm 7\%$
300 μ m (No. 50)	25	$\pm 5\%$
150 μ m (No. 100)	8	$\pm 3\%$

8.2.10 Crumb Rubber Modified Asphalt Concrete-Gap Graded (CRUMAC-GG):

CRUMAC-GG shall be the product of mixing mineral aggregate, asphalt binder, and Crumb Rubber Modifier (CRM) at a central mixing plant and shall conform to 203-6 of Greenbook except as modified herein.

8.2.11 Composition and Grading:

Crumb Rubber Modified Asphalt Concrete-Gap Graded (CRUMAC-GG) will be designated by class, i.e., CRUMAC-GG-C and shall conform to the requirements of this subsection and Table 203-11.3 of Greenbook.

8.3 CONSTRUCTION METHODS

8.3.1 Slurry Mixing and Spreading Equipment:

The REAS shall be mixed either by a continuous flow mixer per 302-4.5 of Greenbook or a central mixing plant. A central mixing plant shall not be used for quick set REAS.

If a central mixing plant is used, combining of the RPME and aggregate in the mixing tank shall be in the presence of the APM. The tank shall be calibrated in liters and gallons and equipped with load cells and a full sweeping agitator capable of producing a homogeneous slurry mix. All storage tanks and delivery vehicles shall be equipped with an agitator. The REAS shall be delivered to the slurry site and spread directly behind the truck with a mechanical-type squeegee distributor, or the slurry may be pumped into smaller trucks equipped with mechanical-type squeegee distributors. All spreading equipment shall contain fog/water systems per 302-4.8 of Greenbook. The mixing tank shall not be used to batch more than one job at a time. Storage tanks for RPME and REAS shall not be used to supply more than one job at a time.

The weight per liter (weight per gallon) of REAS delivered to the spreader box shall be within: 0.11 kg/L (0.92 lbs./gal) of the mix design.

8.3.2 Field Mixing and Spreading Equipment Calibration:

Calibration shall conform with 302-4.2 of Greenbook and the following. Calibration shall be as per International Slurry Surfacing Association (ISSA). If the tests do not meet specification requirements, additional tests shall be performed at the Contractor's expense until an acceptable mix is obtained.

8.3.3 Application of REAS:

The application of REAS shall conform to 302-4.8 of Greenbook, except for the following conditions, and RPME application rates specified in Table 23-3.3(A). REAS shall not be applied when the atmospheric temperature is less than. 10 °C (50 °F) or when the atmospheric temperature at 7 a.m. is 24 °C (75 °F) or over, and rising to a forecast high of 39

°C (100 °F). The total time of mixing in the slurry machine shall not exceed 5 minutes.

TABLE 23-3.3 (A)
RPME APPLICATION RATES

Aggregate Type	Application Rate meter ² /liter of RPME	Application Rate feet ² /gallon of RPME
Fine Slurry Aggregate	0.86 to 0.98	35 to 40
Type I Slurry Aggregate	0.69 to 0.86	28 to 35

8.3.4 Field sampling:

Field sampling shall conform to 302-4.9 of Greenbook.

8.3.5 Public Convenience and Traffic Control:

Public convenience and traffic control shall conform to 302-4.7 of Greenbook.

8.3.6 Proportioning

Proportioning shall conform to 203-6.7.3.2 of Greenbook, except that proportioning of CRM shall be performed using an automatic batching system and the only manual operation required for proportioning of all materials shall be the single operation of a switch or starter. The CRM feeder system shall be able to deliver CRM to the mixture at an accuracy of 0.1 % of the total weight of mix. The Contractor shall submit to the APM, in writing, the method proposed to deliver the CRM to the mixture. The method and equipment proposed for use shall be so designated and accessible that the APM can visually observe the materials being incorporated into the mixture. All weighing and metering devices used in the production of CRUMAC shall be calibrated. When batch-type plants are used, the CRM shall be proportioned by weight.

8.4 METHOD OF MEASUREMENT

8.4.1

The REAS shall be paid based on the liters (gallons) of RPME used. Measurement of RPME shall be the liter (gallon) computed by dividing the weight obtained from Certified Weighmaster Certificates by 1.02 kg/L (8.5 lbs/gal). The Contractor shall also present Weighmaster's Certificates for the amount of such material remaining unused at the completion of the work at no cost to the Agency. Payment will be determined by deducting the amount of the unused material from the total amount of material delivered.

The pay quantity for REAS shall be the total number of liters (gallons) for RPME (excluding aggregate) used on the project. Such price shall include full compensation for specified surface preparation, removals, sweeping, aggregate required in the mix design, and for constructing the REAS in place.

Payment reduction for noncompliance shall conform to 302-4.11.1.1 and 302-4.11.1.2 of Greenbook.

8.4.2

Surface Treatment shall be measured by the square yard of treated area completed and accepted by the APM. Crack sealing and weed control will be paid separately.

8.5 BASIS OF PAYMENT

8.5.1

Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, disposal, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete the bid item.

Payment will be made under:

Bid Item 17: Rubberized Emulsion-Aggregate Slurry, per square yard

END OF SPECIFICATION 8

9 TRAFFIC CONTROLS (STRIPING), PARKING STALL BUMPERS, GUARD RAIL, DELINEATOR & PAVEMENT MARKERS

9.1 GENERAL

9.1.1 Applicable Documents:

The following specification standards of the issues listed in this paragraph (including the amendments, addenda and errata designated), but referred to hereinafter by basic designation only, form a part of this specification to the extent required by the references thereto.

9.1.2 Federal Specifications:

TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
TT-B-1325D	(Glass Spheres); Reflective Additive to Paint

9.1.3 State of California, Department of Transportation:

Whenever this specification is referenced, the following is understood:

All references to Caltrans specification, it shall mean Standard Specifications of State of California Department of Transportation (2025 or latest Edition).

All references to statistical testing are deleted.

Whenever a discrepancy occurs between the Standard Specification and this specification, it is understood that this specification governs.

All references to measurement and payment are deleted.

U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.

9.1.4 Requirements:

The work includes the following:

9.1.5 9-1.5.1 and 9-1.5.2:

Not Used.

9.1.6

Replacement of parking stall bumpers with new concrete bumpers.

9.1.7

Replacement of metal guard rail as directed.

9.1.8 Submittals:

Prior to commencement of any work, the Contractor shall submit striping plan for approval of the APM. The striping plan shall show placement of concrete bumpers.

9.2 MATERIALS

9.2.1 Not used.

9.2.2 Not used.

9.2.3 Raised pavement markers:

Raised pavement markers shall conform to the provisions of Section 81, "Miscellaneous Traffic Control Devices" of the 2025 Caltrans Standard Specification.

9.2.4 Parking stall bumpers:

Parking stall bumpers shall be prefabricated reinforced concrete 7 inches to 8 inches wide, 6-1/2 inches to 7 inches high and 72 inches long. Concrete shall develop a minimum compressive strength of 2500 psi at age of 28 days and shall have a minimum of two No. 3 reinforcing bars and two pipe sleeves for anchors for each bumper.

9.2.5 Not used.

9.2.6 Street signs:

Work and symbol markings shall conform to the applicable requirements of the "Manual on Uniform Traffic Control Devices" (MUTCD) and section 82, "Signs and Markers" of the 2025 Caltrans Standard Specification unless otherwise indicated.

9.2.7 Metal beam guard railing:

Metal Beam Guard Railing shall conform to the 2025 Caltrans Standard Specifications Section 83-1.02B and related state standard plans.

9.3 CONSTRUCTION METHODS

9.3.1 Not Used.

9.3.2 Not Used.

9.3.3 Not Used.

9.3.4

Parking stall bumpers shall have two No. 4 x 15-inch reinforcing bars driven through asphalt concrete pavement or set in an epoxy adhesive approved by the APM.

9.3.5

Reflectorized pavement markers shall conform to Section 81, "Miscellaneous Traffic Control Devices" of the 2025 Caltrans Standard Specification.

Blue raised reflective pavement marker shall be installed adjacent to all existing fire hydrants in accordance with Section 3B.11 of the latest CA MUTCD

9.3.6

Raised pavement buttons (non-reflective pavement markers) and channel markers shall conform to this specification.

9.3.7

Non-reflective pavement markers (Types A and AY) shall be, at the option of the Contractor, either ceramic or plastic conforming to these specifications. Channel markers shall be ceramic.

The top surface of the marker shall be convex with a gradual change in curvature. The top, bottom and sides shall be free of objectionable marks or discoloration that will affect adhesion or appearance.

The bottom of markers shall have areas of integrally formed protrusions or indentations, which will increase the effective bonding surface area of adhesive. The bottom surface of the marker shall not deviate more than 0.05-inch from a flat surface. The area of protrusion shall have faces parallel to the bottom of the marker and shall project approximately 0.04-inch from the bottom.

9.3.8 Non-Reflective Pavement Markers (Ceramic):

Ceramic non-reflective pavement markers Types A and AY and ceramic channel markers shall consist of a heat-fired, vitreous, ceramic base and a heat-fired, opaque, glazed surface to produce the properties required in these specifications. The markers shall be produced from any suitable combination of intimately mixed clays, shales, talcs, flints, feldspars or other inorganic material which will meet the properties herein required. The markers shall be thoroughly and evenly matured and free from defects which affect appearance or serviceability.

9.3.9 Testing:

Tests shall be performed in conformance with the requirements in California Test 669.

Test	Test Description	Requirement
a	Bond strength	700 psi, min.
b	Glaze thickness	0.007", min.
c	Hardness	6 Moh, min.
d	Luminance factor, Type A, white markers only, glazed surface	75, min.
e	Yellowness index, Type A, white markers only, glazed surface	7, max.
f	Color-yellow, Type AY, yellow markers only. The chromaticity coordinates shall be within a color box defined in CTM 669	Pass
g	Compressive strength	1500 lbs, min.
h	Water absorption	2.0 %, max.
i	Artificial weathering, 500 hours exposure, yellowness index	20, max.

9.3.10 Non-Reflective Pavement Markers (Plastic):

Plastic non-reflective pavement marker Types A and AY shall be, at the option of the Contractor, either polypropylene or acrylonitrile-butadiene-styrene (ABS) plastic type.

Plastic markers shall conform to the testing requirements specified in the table above, except that Tests a, b, c, and h shall not apply. The plastic markers shall not be coated with substances that interfere with the ability of the adhesive to bond to the marker.

9.3.11 Road Signs

Road signs shall conform to the plans and directions of Hollywood Burbank Airport. Materials and construction shall conform to Section 82, "Signs and Markers" of the 2025 Caltrans Standard Specifications. New signposts shall be 4" x 4" redwood.

9.3.12 Metal Beam Guard Railing:

Removal of existing guard rail shall be performed to minimize damage to the existing railing and posts. Posts shall be extracted, and the holes backfilled with select material.

New railing shall be placed as directed by Hollywood Burbank Airport. Materials and execution shall be in accordance with the 2025 Caltrans Standard Specification 83-102B.

9.4 METHOD OF MEASUREMENT

9.4.1

Traffic control, stall bumpers, guard rail, delineators, pavement markers and buttons, temporary traffic controls, shall be measured by the unit of line items completed and accepted by APM.

9.5 BASIS OF PAYMENT

9.5.1

Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, disposal, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete the bid item.

Payment will be made under:

Bid Item: 19:	Concrete Wheel Stop Installed, per each
Bid Item: 20	Provide, Place, Remove Temporary Reflective Pavement Markers, per each
Bid Item: 21	Guard Railing (New) Post & Rails, per linear foot
Bid Item: 22	Remove and Dispose of Guard Rails, per linear foot
Bid Item: 23	Delineators White or Yellow, per each
Bid Item: 24	Provide In-Place Raised Reflective (Single or Double Faced) Pavement Markers (Blue/White/Yellow), per each
Bid Item: 25	Road Signs on Single Post, per each

END OF SPECIFICATION 9

10 SELECT AGGREGATE BASE

10.1 GENERAL

10.1.1 Applicable publications:

The following publications of the issues listed below, but referred to hereinafter by basic designation only, form a part of this specification to the extent required by the references thereto:

10.1.2 State of California, Department of Transportation:

Standard Specifications, Section 26 “Aggregate Bases” (2025 or Latest Edition). Whenever this specification is referenced, the following is understood:

All references to statistical testing are deleted.

Whenever a discrepancy occurs between the Standard Specification and this specification, it is understood that this specification governs.

All references to measurement and payment are deleted.

10.1.3 American Society for Testing and Materials (ASTM)

D1556	Test Method for Density of Soil in Place by the Sand Cone Method
D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))

10.1.4 Quality Control:

Sampling and testing of materials and equipment for compliance with the specifications shall be performed by an approved independent commercial testing laboratory (approved by APM) at the expense of the Contractor. All samples and tests specified for the conformance and quality control shall be taken to correctly reflect the construction work.

Certified copies of all tests shall be approved by the Contractor and submitted to APM.

10.1.5 Submittals:

Prior to beginning work, submit to APM for approval test reports and certificates of compliance for aggregate base.

10.1.6 Requirements:

The aggregate base for area to be reconstructed as shown on the plans shall conform to the requirements of the 2025 Caltrans Standard Specifications Section 26, “Aggregate Bases” and the following special provisions.

10.2 MATERIALS

10.2.1 Aggregates:

Aggregates for base course shall conform to Section 26, "Aggregate Bases" of the 2025 Caltrans Standard Specification, Class 2, for 1-1/2-inch maximum size gradation.

10.3 CONSTRUCTION METHODS

10.3.1 Subgrade Preparation:

Prior to construction of base course, the subgrade shall be compacted and graded for trueness to line and grade. Ruts or soft-yielding areas in the subgrade shall be corrected by removing or adding material, aerating or wetting the subgrade materials and compacting to 95% of ASTM D1557 maximum density.

10.3.2 Base Course:

Aggregate base shall be placed in accordance with requirements of Section 26, "Aggregate Bases" of the 2025 Caltrans Standard Specifications. The materials shall be graded and compacted in 4- inch to 6-inch layers to 100 percent of maximum density.

10.3.3 Maintenance:

The base course shall be maintained until the pavement is in place. Maintenance shall include drainage, rolling, shaping and water as necessary to maintain the course in proper condition. Sufficient moisture shall be maintained at the surface to prevent a dusty condition by light sprinkling with water. Areas of completed base course that are damaged by freezing shall be conditioned, reshaped and re-compacted in accordance with the requirements of this specification, without additional cost to Hollywood Burbank Airport.

10.3.4 Finish Surface:

Surface tolerance shall comply with the Standard Specifications.

10.3.5 Compaction:

Each layer shall be uniformly compacted to the percentage of maximum density specified. The Contractor shall add moisture or aerate each layer to bring the moisture content of the materials to the optimum moisture content. When necessary, the Contractor selected equipment and construction procedures shall be altered, changed or modified in order to meet the specified compaction requirements. Optimum moisture, maximum density (OMMD) shall be determined for the specified maximum density in accordance with ASTM D1557. During compaction the dry unit weight of the compacted materials shall be determined for the specified in-place density in accordance with ASTM D1556. Aggregate base material shall be compacted to 100 percent of the maximum unit weight (ASTM D1557). Moisture content shall be maintained between -2 and +2 percent of optimum moisture content during compaction. Subgrade soils shall be firm and unyielding at the time the aggregate base materials are placed and compacted. Adequate drainage (both surface and subsurface) shall be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

10.3.6 Inspection:

Job inspection shall be performed in accordance with Caltrans Standard Specification Section 5 "Control of Work" and general provisions of the contract and shall include verification of the quality of the base course materials. All sampling and testing shall be performed by an approved, independent commercial testing laboratory (approved by APM) at the Contractor's expense.

10.3.7 Tests:

Minimum number of tests shall be in accordance with Caltrans Standard Section 26-1.01 D (2) (d) "Quality Control Testing". One Moisture-Density relationship test shall be made in accordance with ASTM D1557 for each type of material which requires in-place compaction determination.

A minimum of 1 base course compaction test shall be made for each area to be reconstructed.

10.3.8 Acceptance:

The acceptance or rejection of the base course shall be determined by the results of the conformance and quality control performed as the work commences and progress for each incremental stage or unit of work. The moisture content of the compacted base course shall be within 1 percent of the optimum.

10.4 METHOD OF MEASUREMENT

10.4.1

Aggregate base in place shall be measured by the number of cubic yards of material, completed and accepted by APM.

10.5 BASIS OF PAYMENT

10.5.1

Payment for aggregate base shall be made at the contract unit prices necessary to complete the work. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, compaction, and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment will be made under:

Bid Item 26:	Aggregate base in place, per cubic yard

END OF SPECIFICATION 10

11 PORTLAND CEMENT CONCRETE, MINOR PAVEMENT REPAIRS

11.1 GENERAL

11.1.1 Applicable Publications:

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

11.1.2 American Concrete Institute (ACI), Latest Editions:

ACI 301	Specification for Structural Concrete
ACI 304R 305R	Guide for Measuring, Mixing, Transporting and Placing Concrete ACI Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 309	Guide for Consolidation

11.1.3 American Society for Testing and Materials (ASTM), Latest Editions:

ASTM A185	Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A497	Standard Specification for Steel Welded Wire Reinforcement, Deformed for Concrete
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A996	Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ASTM A706/A706M	Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete ASTM C150 Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete ASTM C172 Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231	Standard Test Method for Air Content for Freshly Mixed Concrete by the Pressure Method

ASTM C260 Standard Specification for Air-Entraining Admixtures for Concrete

ASTM C309 Standard Specification for Liquid Membrane-Forming Compound for curing Concrete

ASTM C494 Standard Specification for Chemical Admixtures for Concrete ASTM C595 Standard Specification for Blended Hydraulic Cements

ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan For Use in Portland Cement Concrete

ASTM C666 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing

ASTM C989 Standard Specification for Slag Cement for Use in Concrete and Mortars ASTM D6690 Standard Specification for Joint and Crack Sealant, Hot-Applied, for Concrete and Asphalt Pavements

ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

ASTM D1752 Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

11.1.4 Army Corps of Engineers (COE) Handbook for Concrete and Cement, Latest Editions:

COE CRD-C 572	Specification for Polyvinylchloride Waterstop
COE CRD-C 621	Non-shrink Grout

11.1.5 Submittals:

11.1.6 Contractor Furnished Mix Design:

Twenty-one (21) days minimum prior to concrete placement, submit a mix design for each strength and type of concrete. Furnish a complete list of materials including type, brand, source and amount of cement, fly ash, pozzolan, admixtures, and applicable reference specifications.

11.1.7 Laboratory Test Reports:

Submit results of fly ash and pozzolan testing and show that the mix has been successfully tested to produce concrete with specified properties and will be suitable for the job conditions. Obtain approval before concrete placement. An identical concrete mix design previously approved within the past 12 months by the Western Division, Naval Facilities Engineering Command, may be used without further approval, provided that copies of the previous approval and fly ash and pozzolan test results performed within 6 months of submittal date are submitted. Obtain acknowledge of receipt prior to concrete placement. Submit additional data regarding concrete aggregates, if the source of aggregate changes.

11.1.8 Field Test Reports:

Submit testing results in accordance with ASTM C31 and as required in paragraph entitled “Testing” under section 11.3.8.2.

11.1.9 Certificates of conformance:

1. Aggregates
2. Admixtures
3. Cement
4. Reinforcement
5. Joint Filler
6. Joint Sealant
7. Fly ash & Pozzolan

11.1.10 Manufacturer’s Data:

1. Materials for curing concrete
2. Admixtures
3. Bond breaker

11.1.11 Delivery and Storage:

ACI 304R Delivery: Do not deliver concrete until ready for concrete placement.

11.1.12 Storage:

Store concrete aggregates to prevent contamination or segregation.

Store reinforcement of different sizes and shapes in separate pile or racks raised above the ground to avoid excessive rusting. Protect from contaminants such as grease, oil, and dirt. Provide for accurate identification after bundles are broken and tags removed.

11.2 MATERIALS

11.2.1 Products:

ACI 211.1: Except as modified herein, concrete shall have a 28-day compressive strength of minimum 3000 psi. Slump shall be between 1 and 3 inches with ASTM C143. Provide ASTM C33 aggregate Size No. 57 or 67 and 4 to 6 percent air entrainment for concrete expose to freeze- thaw conditions. Accomplish air-entrainment using an air-entraining admixture.

11.2.2 Cement:

Conform to the requirements of ASTM C150, Type II or V (depending on the site conditions as evaluated by the APM)

11.2.3 Water:

Fresh, clean, and potable.

11.2.4 Aggregates:

Free from any substance which may be deleteriously reactive with the alkalis in the cement

11.2.5 Fine Aggregates:

Conform to the requirements of ASTM C33.

11.2.6 Coarse Aggregates:

Conform to the requirements of ASTM C33, Size No. 67.

11.2.7 Admixtures:

Where not shown or specified, the use of admixtures is subject to written approval of the AP.

11.2.8 Air-Entraining:

Conform to the requirements of ASTM C666

11.2.9 Retarding:

Conform to the requirements of ASTM C494, type B or D.

11.2.10 Accelerating:

Conform to the requirements of ASTM D98.

11.2.11 Water Reducing:

Conform to the requirements of ASTM C494, Type A, D, E, F, or G.

11.2.12 Fly Ash and Pozzolan:

Conform to the requirements of ASTM C618, type N, F, or C, except that the maximum allowable loss on ignition shall be 6 percent for type N and F.

11.2.13 Forms:

Wood, Plywood, steel, or other suitable material.

11.2.14 Reinforcement:

Tie Bars-Bar shall conform to ASTM A 615 including supplementary requirements.

11.2.15 Reinforcement for Slabs:

Welded steel wire fabric shall conform to ASTM A 185 and welded deformed steel wire fabric shall conform to ASTM A 497. Deformed steel bar mats shall conform to ASTM A184. Bar reinforcement shall conform to ASTM A615 including supplementary requirements.

11.2.16 Curing Materials:

Impervious Sheeting: ASTM C171 with a minimum sheet thickness of 10 mils.

Liquid Membrane-forming Compound: ASTM C309, white pigmented, Type 2, Class B, free of paraffin or petroleum.

11.2.17 Joint Fillers and Sealants:

Provide as required.

11.2.18 Bond Breaker:

Conform to the requirements of ASTM D41

11.2.19 Contractor-Furnished Mix Design:

Design mix in accordance with ACI 211.1. The concrete shall conform to the following:

Minimum Compressive Strength 28 days (psi)	3000
Minimum Flexural Strength 28 days (psi)	650
Maximum Aggregate Size (inches)	3/4
Min. Cement Content lbs./yd	517
Maximum Water-Cement Ratio (by Weight)	0.50
Range in Slump (In.)	1-3

- a. Allowable air content: 5 1.5 percent by volume.
- b. The minimum cement content is required for durable concrete with local aggregates but may be insufficient to obtain the specified strength, in which case, increase the cement content as necessary, without additional compensation under the contract.
- c. Do not include fly ash content when calculating the cement content.

11.3 CONSTRUCTION METHODS

11.3.1 Forms:

Construct forms to be removable without damaging the concrete. In lieu of setting forms, the edge of an existing pavement section may be used as a form.

11.3.2 Coating:

Before placing the concrete, coat the contact surfaces of forms except existing pavement sections where bonding is required, with a non-staining mineral oil, nonstaining form coating compound, or two coats of nitro-cellulose lacquer. When using existing pavement as a form, clean existing concrete and then coat with a bond breaker before concrete is placed.

11.3.3 Grade and Alignment:

Check and correct grade elevations and alignment of the forms immediately before placing the concrete.

11.3.4 Reinforcement:

11.3.4.1 Tie Bars:

Install bars, accurately aligned horizontally and vertically, at indicated locations. For slip form construction, bent tie bars for concrete shoulder lanes shall be inserted by hand.

11.3.4.2 Setting Slab Reinforcement:

The type and amount of steel reinforcement shall be as shown on the drawings. For pavement thickness of 12 inches or more, install the reinforcement steel by the strike-off method wherein the concrete is deposited on the underlying material, consolidated and struck to the indicated elevation of the steel reinforcement. Place the reinforcement on the pre-struck surface and then place the remaining concrete and finish in the required manner. If the second lift causes the steel to be displaced horizontally from its original position, it increases the thickness of the first lift and depresses the reinforcement into the plastic concrete to the required elevation. The increase in thickness shall be only as necessary to permit elevation. The increase in thickness shall be only as necessary to permit correct horizontal alignment to be maintained. Remove and replace portions of the bottom layer of concrete that have been placed for more than 30 minutes without being covered with top layer. Wire mesh reinforcement may be placed with mechanical mesh placers and vibrated into place. For pavements less than 12 inches thick, the reinforcement may be positioned on suitable chairs prior to concrete placement, or the reinforcement steel may be depressed into the plastic concrete to the required elevation after the concrete has been spread. At expansion, contraction and construction joints, place the reinforcement as indicated. Reinforcement, when placed in concrete, shall be free of mud, oil, scale or other materials that may adversely affect or reduce the bond. Reinforcement shall be accurately placed and wired securely. The laps at splices and the distances from ends and sides of slabs and joints shall be as indicated.

11.3.5 Measuring, Mixing, Transporting, and placing Concrete

11.3.5.1 Measuring:

Conform to the requirements of ASTM C94.

11.3.5.2 Mixing:

ASTM C94, except as modified herein. Begin mixing within 30 minutes after the cement has been added to the aggregates. If the air temperature is greater than 85 degrees F, reduce mixing time and place concrete within 60 minutes. Additional water may be added to bring the slump within required limits as specified in Section 11.2.19 may be added of ASTM C94, provided that the specified water-cement ratio is not exceeded.

11.3.5.3 Transporting:

ACI 304R, except as modified herein. Do not exceed a free vertical drop of 3 feet from the point of discharge. When placing reinforced concrete in two courses, place second course within 30 minutes of striking off first course.

11.3.5.4 Vibration:

Immediately after spreading concrete, consolidate the concrete adjacent to forms and joints regardless of slab thickness, and concrete slabs 6 inches or more in thickness using internal vibrating equipment. For reinforced pavement laid in two courses, vibrate only the top course. Vibrate concrete for full depth adjacent to edge forms and joints. Limit the duration of vibration to that necessary to produce consolidation of the concrete. Excessive vibration will not be permitted. Vibrators shall not be operated in the concrete at one location for more than 15 seconds. At the option of the Contractor, vibrating equipment of a type approved by the APM may be used to compact the concrete in un-reinforced pavement slabs less than 6 inches thick.

11.3.5.5 Vibrating Equipment:

Operate equipment, except hand-manipulated equipment, ahead of the finishing machine. Select the number of vibrating units and power of each unit to properly consolidate the concrete. Mount the units on a frame that is capable of vertical movement and, when necessary, radial movement, so the vibrators may be operated at any desired depth within the slab or be completely withdrawn from the concrete. The clear distance between frame-mounted vibrating units that have spuds that extend into the slab at intervals across the paving lane shall not exceed 30 inches. The distance between the end of the vibrating tube and the side form shall not exceed 2 inches. For pavements less than 10 inches thick, operate the vibrators at mid-depth parallel with or at a slight angle to the subbase. For thicker pavements, angle the vibrators toward the vertical, with the vibrator tip preferably about 2 inches from the subbase, and top of the vibrator a few inches below the pavement surface. The vibrators may be pneumatic, gas driven, or the electric type, and shall be operated at frequencies within the concrete of not less than 8,000 vibrations per minute. The amplitude of vibration shall be such that noticeable vibrations occur at 1.5-foot radius when the vibrator is inserted in the concrete to the depth specified.

11.3.5.6 Cold Weather:

Maintain required concrete temperature in accordance with Figure 2.1.5 in ACI 305 to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. Cool ingredients spread and remove polyethylene sheeting between finishing operations, apply monomolecular film, or use other suitable means to reduce the evaporation rate. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage. Cool underlying material by sprinkling lightly with water before placing concrete. Recommended practices may be found in ACI 305R.

11.3.6 Finishing Concrete

11.3.6.1 General Requirements:

Start finishing operations immediately after placement of concrete. Use finishing machine, except hand finishing may be used in emergencies and for concrete slabs inaccessible locations or of such shapes or sizes that machine finishing is impracticable. Finish the surface of the pavement on both sides of a joint to the same grade. Finish formed joints form securely supported transverse bridge. Provide hand finishing equipment of use at all times. Transverse and longitudinal surface tolerances shall be 1/4 inch in 10 feet.

11.3.6.2 Defects:

Repair formed surfaces by removing minor honeycombs, pits greater than 1 square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink grout. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycomb (including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate, or other defects) which affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair. The surface of the concrete shall not vary more than the allowable tolerances of FAA P-501. Exposed surfaces shall be uniform in appearance and finished to a texture consistent with surrounding pavement, unless otherwise specified.

11.3.6.3 Side Form Finishing:

Strike off and screen the concrete to the required crown and cross-section by a power-driven transverse finishing machine. Transverse rotating tube or pipe shall not be permitted unless approved by the APM. The elevation of the concrete shall be such that, when consolidated and finished, the surface of the pavement shall be adequately consolidated and at the required grade. Equip the finishing machine with two screens which are readily and accurately adjustable for changes in pavement crown and compensation for wear and other causes. Make as many passes over each area of pavement and at such intervals as necessary to give the proper compaction, retention of the coarse aggregate near the finished surface, and a surface of uniform texture, true to grade and crown. Do not permit excessive operation over an area, which will result in an excess of mortar and water being brought to the surface.

11.3.6.4 Equipment Operations:

Maintain the travel of machine on the forms without lifting, wobbling, or other variation of the machine which tend to affect the precision of concrete finish. Keep the tops of the forms clean by a device attached to the machine. During the first pass of the finishing machine, maintain a uniform ridge of concrete ahead of the front screen for its entire length.

11.3.6.5 Joint Finish:

Before the concrete is hardened, correct any edge slump of the pavement, exclusive of edge rounding, in excess of 0.02 foot. Finish the concrete surface on each side of the construction joints to the same plane and correct all deviations before the newly placed concrete has hardened.

11.3.6.6 Hand Finishing:

Strike-off and screen the surface of the concrete to elevations slightly above finish grade so that when the concrete is consolidated and finished the surface of the pavement is at the indicated elevation. Vibrate the entire surface until the required compaction and reduction of surface voids is secured with a strike-off template.

11.3.6.7 Longitudinal Floating:

After the initial finishing, further smooth and consolidate the concrete by means of hand-operated longitudinal floats. Use floats that are not less than 12 feet long and 6 inches wide and stiffened to prevent flexing and warping.

11.3.6.8 Pavement Finish:

Screen the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screening, float the concrete longitudinally. Use a straight edge to check slope and flatness; correct and refloat as necessary. Obtain final finish by dragging a strip of clean, wet burlap from 30 to 10 feet wide and 2 feet longer than the pavement width across the slab. Produce a fine, granular, or sandy textured surface without disfiguring marks. Round edges and joints with an edger having a radius of 1/8 inch.

11.3.6.9 Surface Finish:

Surface finish of new pavement shall match existing.

11.3.6.10 Plastic grooving:

After surface irregularities have been removed, give the concrete surface a uniformly roughened finish by use of a wire comb or other approved texturing device similar to a wire comb. Prior to plastic grooving, make one pass with burlap drag in the longitudinal direction. Complete the grooving while the concrete surface is in such condition that it will not be torn or unduly roughened, and before the surface has obtained its initial set. Texture small or irregular areas, or areas not suitable for machine texturing, with a hand operated device producing a textured surface equivalent to that required for machine combing.

11.3.6.11 Edging:

At the time the concrete has attained a degree of hardness suitable for edging, carefully finish all slab edges, including the edges at formed joints, with an edge having a maximum radius of one-eighth inch. Clean by removing all loose fragments and soupy mortar from corners or edges of slabs which have crumbled and areas which lack sufficient mortar for proper finishing. Refill the voids solidly with a mixture of suitable proportions and consistency and refinish. Remove all unnecessary tool marks and edges. All remaining edges shall be smooth and true to line.

11.3.7 Curing and Protection:

11.3.7.1 General Requirements:

Protect concrete adequately from injurious action by sun, rain, flowing water, frost, mechanical injury, time marks and oil stains, and do not allow it to dry out from the time it is placed until the expiration of the minimum curing periods specified herein. Use impervious-sheeting curing, or liquid membrane-forming compound on surfaces where its appearance would be objectionable, on any surface to be painted, where coverings are to be bonded to the concrete, or on concrete to which other concrete is to be bonded. Maintain the temperature of the air next to the concrete above 40 degrees F for the full curing periods.

11.3.7.2 Impervious-Sheeting Curing:

Wet the entire exposed surface thoroughly with a fine spray of water and then cover with impervious sheeting. Lay sheets directly on the concrete surface and overlap 12 inches. Make sheeting not less than 18 inches wider than the concrete surface to be cured, and weight down on the edges and over the transverse laps to form closed joints. Repair or replace sheets if torn or otherwise damaged during curing. Leave the sheeting on the concrete surface to be cured for at least 7 days.

11.3.7.3 Liquid Membrane-Forming Compound Curing:

Seal or cover all joint openings prior to application of the curing compound to prevent the curing compound from entering the joint. Compound shall remain on the concrete for 7 days before sealer or covering is removed and joint sealing material is placed in the joints.

11.3.7.4 Application:

Apply the compound immediately after the surface loses its water sheen and has a dull appearance and before joints are sawed. Agitate curing compound thoroughly by mechanical means during use and apply uniformly in a two-coat continuous operation by suitable power-spraying equipment. The total coverage for the two coats shall be at least one gallon of undiluted compound per 200 square feet. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. Apply an additional coat of the compound immediately to areas where the film is defective. Re-spray concrete surfaces that are subject to heavy rainfall within 3 hours after the curing compound has been applied in the same manner.

11.3.7.5 Protection of Treated Surfaces:

Keep concrete surfaces to which liquid membrane-forming compounds have been applied free from vehicular traffic and other sources of abrasion for not less than 72 hours. Foot traffic is allowed after 24 hours for inspection purposes. Maintain continuity of the coating for the entire curing period and repair damage to the coating immediately.

11.3.8 Sampling and testing

11.3.8.1 Sampling:

Collect samples of fresh concrete in accordance with ASTM C172 during each working day as required to perform all test specified herein. Make test specimens in accordance with ASTM C31.

11.3.8.2 Testing:

Consistency Tests:

Determine slump in accordance with ASTM C143. Take samples for slump determination from the concrete while it is being placed. Perform tests at the beginning of a concrete placement operation and at subsequent intervals to ensure that the specification requirements are met. In addition, perform tests each time test beams cylinders are made.

Flexural Tests:

Determine flexural strength in accordance with ASTM C78. Make four test specimens for each set of tests. Test two specimens at 7 days, and the other two at 28 days. The strength of the concrete will be considered satisfactory if the average 28-day test results equals or exceeds the specified 28-day flexural strength, and no individual strength test is less than 500 pounds per square inch. Frequency of flexural tests on concrete beams shall be not less than four test beams for each 50 cubic yards of concrete, or fraction thereof, placed. Concrete which is determined to be defective, based on the strength acceptance criteria therein, shall be removed and replaced with acceptable concrete.

Air Content:

Test air-entrained concrete for air content at the same frequency as specified for slump tests. Determine percentage of air in accordance with ASTM C231 on samples taken during placing of the concrete in the forms.

11.3.9 Down drains, curbs, gutters, swales, curbs and sidewalks

PCC concrete for curbs, gutters and swales shall conform to Section 90-02 of the 2025 Caltrans Standard Specification except as modified in Section 73 of the 2025 Caltrans Standard Specification.

Construction of PCC concrete curbs and sidewalks shall conform to Section 73 of the Standard Specification.

Corrugated metal down drains shall conform to Section 66 of the 2025 Caltrans Standard Specification; thickness of pipe shall conform to Section 66-1.02. Backfilling and compaction for corrugated pipe shall conform to Section 19-3 of the 2025 Caltrans Standard Specification.

11.3.9.1 Concrete Walks:

Provide 4 inches thick minimum. Provide contraction joints spaced every 5 linear feet, unless otherwise indicated. Cut contraction joints 3/4 inch deep with a jointing tool after the surface has been finished. Provide 0.5-inch-thick transverse expansion joints at changes in direction, where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space joints not more than 50 feet apart. Provide a transverse slope of 1/4 inch per foot. Limit variation in cross section to 1/4 inch in 5 feet.

11.3.9.2 Pits and Trenches:

Place bottoms and walls monolithically or provide water stops and keys.

11.3.9.3 Swales:

Provide 6 inches thick. Form to line and grade as directed by APM.

11.3.9.4 Curbs (and gutters):

Provide contraction joints spaced every 10 feet maximum, unless otherwise indicated. Cut contraction joints 3/4 inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2 inch thick and spaced every 100 feet maximum, unless otherwise indicated. Provide a broom finish.

11.3.9.5 Expansion Joints:

Expansion joint filler material shall conform to Section 73, "Concrete Curbs and Sidewalks" of the 2025 Caltrans Standard Specification.

11.3.10 Miscellaneous Concrete Structures:

Miscellaneous concrete structures shall be constructed in accordance with Section 73, "Concrete Curbs and Sidewalks," of the Caltrans Standard Specifications. This includes, but is not limited to, curb ramps, driveways, gutter depressions, island paving, and other appurtenances associated with pedestrian and vehicular access. All concrete work must conform to the dimensions, slopes, and grades specified in the contract documents and meet Americans with Disabilities Act (ADA) requirements. Prior to placement, the contractor shall verify form alignment, subgrade preparation, and ensure compliance with specified tolerances. Concrete shall be placed using approved methods, with proper curing and protection measures implemented immediately after placement. Detectable warning surfaces must be selected from the Authorized Materials List and installed per manufacturer's recommendations. All work shall be subject to inspection and must meet the quality control standards outlined in Section 73 to ensure durability, safety, and compliance with applicable regulations.

11.4 METHOD OF MEASUREMENT

11.4.1

Miscellaneous Portland cement concrete pavement shall be measured by the cubic yard completed and accepted by APM. Portland Cement Concrete sidewalk, curb and gutter and swale shall be paid at the unit rate completed and accepted by APM. Roadway repairs shall be measured and paid at the unit rate completed and accepted by APM.

11.5 BASIS OF PAYMENT

11.5.1

Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all material and for all preparation, hauling, disposal, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete the bid item.

Payment will be made under:

Bid Item 27:	Portland Cement Concrete Pavement for Non-Airfield, per cubic yard

- Bid Item 28: Miscellaneous Concrete Structures, per cubic yard
- Bid Item 29: PCC Curb & Gutter Installed, per linear foot
- Bid Item 30: PCC Swale Installed 6" Thick, per cubic yard

END OF SPECIFICATION 11

12 TRAFFIC CONTROL

12.1 DESCRIPTION

Temporary Traffic Control shall be in accordance with Caltrans Standard Plans 2025 or latest edition, and/or CA Manual on Uniform Traffic Control Devices (MUTCD) 2014 or latest edition and revision. For areas impacting pedestrian and vehicular traffic, Contractor shall submit a Traffic Control Plan (TCP) signed and stamped by a registered Civil Engineer or Traffic Engineer.

12.2 CONSTRUCTION METHODS

The Contractor shall maintain vehicular and pedestrian traffic at all times during construction activities and operations to the requirements as specified herein. The Contractor shall provide, maintain and operate all equipment and facilities to ensure the effectiveness and safety of the vehicular and pedestrian traffic throughout and/or near the Contractor's work area. Emergency vehicle access shall be maintained to all residences, businesses and institutions within the construction area at all times.

When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic. No excavation within five (5) feet of the traveled way shall remain open longer than is necessary to perform the work, and in no case shall remain unfenced or unplated overnight or on weekends.

The Contractor shall provide and maintain all signs, changeable message boards, barricades, pedestals, flashers, delineators and other necessary facilities for the protection of the motoring public within the limits of the construction area and all its approaches, including advanced signing and barricades. Contractor shall also post proper signs to notify the public regarding the conditions of the roadway, all in accordance with these Special Provisions and the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD). This manual may be downloaded from the Department of Transportation State of California website.

The Contractor shall provide for safe pedestrian access at all times. The Contractor shall provide AC or PCC all-weather surface walking area at least five (5) feet wide for continuous pedestrian traffic at all times where practical. Demolition of existing sidewalk shall not occur until utilities and curb and gutter are constructed for the non-interfering portions of the respective Phase of work. Safe pedestrian access consistent with ADA guidelines shall be provided within the construction area at all times.

Lane clearance shall be a minimum of five (5) feet from an open trench. Open trench work within five (5) feet of traveled way shall have temporary railing (Type K) in place to protect construction area, or as directed by the APM. Temporary railing shall conform to 2025 Caltrans Standard Plans T3A and T3B, "Temporary Railing (Type K)." Temporary protective fencing shall be placed around the open trench, as requested by the APM.

The Contractor shall maintain a minimum travel lane width of 11 feet in each direction during any construction operation. Changes in the prescribed lane width and/or lane closures must be approved by the APM.

Access to private properties shall be maintained at all times during the construction where practical. Prior to restricting normal access to private properties, the Contractor shall provide notification as required in these Specifications. In no case shall access to private property be restricted longer than eight (8) hours unless otherwise approved by the APM.

The Contractor shall provide access, at least temporary access, to all business and residential driveways except at those times when construction operations specifically prohibit such access. At least 72 hours prior to restricting such access, the Contractor shall contact the resident and advise of the nature and duration of the restriction in order to give the residents an opportunity to relocate their vehicles.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor, at Contractor's expense.

Portable delineators, either conical (traffic cone) or tubular shaped plastic devices, with a minimum height of 28 inches shall be spaced as necessary for proper delineation of the travel way. The maximum spacing between delineators should be approximately equal in feet to the speed limit, except that the maximum spacing shall not exceed fifty (50) feet.

If the traffic cones or portable delineators are damaged, displaced or are not in an upright position, from any cause, said cones or portable delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor. All delineators shall be 28-inch minimum portable, reflectorized and maintained erect in indicated position at all times, and shall be repaired, or cleaned as necessary to preserve their appearance and continuity. The Contractor shall provide a contact number and be available 24 hours per day to maintain traffic cones and delineators.

A flashing arrow sign shall be used for each lane closed on a multi-lane highway. Flashing yellow beacons shall be used on all W20-1 signs and all Type II barricades guarding the work are overnight. When road work speed limit sign is proposed the Contractor shall cover all conflicting regulatory speed limit signs.

APM reserves the right to make any changes necessary as field conditions warrant. Any changes shall supersede the Contract Traffic Control Plans and be done solely at the Contractor's expense.

The Contractor shall furnish such flagmen as are necessary to give adequate warning to traffic or to the public of any dangerous conditions to be encountered. Flagmen, while on duty and assigned to give warning to the public that the highway is under construction and of any dangerous conditions to be encountered as a result thereof, shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Instructions to Flaggers," by the State of California, Department of Transportation. The equipment shall be furnished and kept clean and in good repair by the Contractor, at its expense.

Should the Contractor appear to be neglectful or negligent in furnishing warning and protective measures as specified herein, the APM may direct attention to the existence of a hazard and the necessary warning and protective measures shall be furnished and installed by the Contractor, at its expense. Should the APM point out the inadequacy of warning and protective measures, such action on the part of the APM shall not relieve the Contractor from responsibility for public safety or abrogate its obligation to furnish and pay for these devices. Public safety by furnishing proper warning and protective devices shall be the sole responsibility of the Contractor.

Contractor shall be responsible for coordinating all reviews and acquiring all permits with any cities.

The Contractor shall conduct work in such a manner as to minimize the disruption of traffic flow. Contractor shall conduct the work in a manner that minimizes loss of parking for the local residents and businesses.

The Contractor shall be required to post and subsequently remove temporary "Tow Away No Parking" signs within parking lots under construction no less than 72 hours prior to the work. The signs shall be posted on a temporary standard, i.e. barricade, delineator, or stake, and shall not be affixed to any public or private property standards or structures. The signs will be furnished by BUR upon request by the Contractor. The Contractor shall fill in the day and date for the scheduled work. When these signs are removed by wind or vandals before the reopening of any area, the Contractor shall repost them.

At the end of each day's work and at other times when construction operations are completed or suspended, all equipment and other obstructions shall be removed from the roadways.

12.3 METHOD OF MEASUREMENT

Full compensation for conforming to the requirements of Maintain Traffic Control including:

1. Furnishing all labor, tools, equipment and materials necessary to do the work,
2. Placement, removal and replacement of detour and temporary striping,
3. Removal (sandblasting, raised pavement markers and etc.),
4. Providing, removing and replacing temporary paving,
5. Providing and maintaining weighted channelizer 42" minimum height with 18 lbs base,
6. Type I, II and III Barricades including rails per 2025 Caltrans Standard Plan A73C,
7. Temporary Crash Cushion, Sand Filled per 2025 Caltrans Standard Plan T1A, T1B and T2
8. Installation, moving, placing replacing and removal of temporary railing, and
9. Signs with stand or A Frame stand.

12.4 BASIS OF PAYMENT

Payment shall be considered as included in the Unit Price as follows and no additional compensation will be allowed therefore:

1. Hourly for Flag person for Traffic Control
2. Weekly for Traffic Control Sign

Payment will be made under:

Bid Item 31:	Flag person for Traffic Control, per hour
Bid Item 32:	Traffic Control Sign, per week

END OF SPECIFICATION 12

13 EROSION, SEDIMENT, AND CHEMICAL CONTROL PLAN

13-1 DESCRIPTION

13.1.1 General requirements:

The Contractor shall submit an Erosion, Sediment, and Chemical Control Plan (ESCCP). The ESCCP shall be developed by a Professional Civil Engineer registered to practice in the State of California who has completed at least twenty-four hours of formal training and received a certificate of completion from a reputable firm that teaches storm water training. Alternatively, a Qualified Stormwater Pollution Prevention Plan Developer (QSD) as defined by the statewide Construction General Permit (Order No. 2022-0057-DWQ or most updated adopted version) may prepare the ESCCP. The Civil Engineer or QSD shall affix their license/certification number on the certification page of the ESCCP. All basin designs will require a licensed Civil Engineer's certification completed with both stamp and signature. The Contractor is notified that the ESCCP must be amended from time to time during construction to reflect actual construction practices, and that each amendment must be made by, or under the direction of, the professional Engineer/QSD who prepared the ESCCP.

13.1.2 Airport Requirement:

Construction projects larger than one acre are required to file a Notice of Intent (NOI) with the Water Board through the Storm Water Multiple Application and Report Tracking System (SMARTS) system. Contractor must also submit a Storm Water Pollution Prevention Plan (SWPPP) developed by the QSD, to the Airport, and designate a Qualified SWPPP Practitioner (QSP) for the project. The contractor shall be fully responsible for managing all SMARTS portal requirements and maintaining compliance with the Construction General Permit. This includes completing and submitting the NOI application, paying all associated fee, and downloading and providing all required documentation, including inspection reports, water sampling results (as applicable), annual reports, and the Notice of Termination (NOT) upon project completion.

For smaller construction projects under one acre, an NOI is not required from the Water Board; however, compliance with Risk Level 1 requirements under the Construction General Permit are still mandatory. These projects must also submit inspection reports, which should include Best Management Practices, to the APM.

The Contractor shall comply with the Airport's Rules and Regulations, including any updates or visions.

13.2 CONSTRUCTION METHODS

Contractor shall at a minimum employ Best Management Practices (BMPs) and good housekeeping practices identified as follows and referenced in Caltrans Construction Site Best Management Practices (BMP) Manual dated March 2024.

1. "Material Delivery and Storage" (WM-1) to prevent, reduce or eliminate the discharge pollutants from material delivery and storage to the stormwater system from materials used by the Contractor on site. Contractor shall store materials on a designated area, install secondary containment (if necessary), conduct regular inspections and provide training to employees and subcontractors, all in accordance with the recommendations of BMP WM-1.

2. "Material Use" (WM-2) to prevent or reduce the discharge of pollutants to storm water from materials used by the Contractor on site. Contractor shall employ alternative products, when possible, shall minimize hazardous material use on-site, and shall provide training to employees and subcontractors in the proper use of materials and BMPs, all in accordance with the recommendations of BMP WM-2.
3. "Stockpile Management" (WM-3) Contractor to provide stockpile management procedures and practices that are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, paving materials such as Portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, all in accordance with recommendations of BMP WM-3.
4. "Spill Prevention and Control" (WM-4) to prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees, all in accordance with recommendations of BMP (WM-4).
5. "Solid Waste Management" (WM-5) to prevent or reduce the discharge of pollutants to storm water from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors, all in accordance with the recommendations of BMP WM-5.
6. "Hazardous Waste Management" (WM-6) to prevent or reduce the discharge of pollutants to storm water from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors, all in accordance with the recommendations of BMP WM-6.
7. "Concrete Waste Management" (WM-8) to prevent or reduce the discharge of pollutants to stormwater from concrete waste by conduction washout off site, performing onsite washout in a designated area, and training employee and subcontractor, all in accordance with recommendations of BMP WM-8.
8. "Sanitary/Septic Waste Management" (WM-9) to provide proper sanitary and septic waste management to prevent the discharge of pollutants to stormwater from sanitary and septic waste. Contractor shall employ convenient, well-maintained facilities and arrange for regular service and disposal, all in accordance with recommendations of BMP WM-9.
9. "Geotextiles and Mats" (EC-7) to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, absorb and hold moisture near the soil surface, and to stabilize soils until vegetation is established. Contractor shall provide appropriate geotextile or mat in accordance with the recommendations of BMP EC-7.
10. "Street Sweeping and Vacuuming" (SE-7) to prevent sediment form from the project site from entering storm drains or receiving waters. Contractor shall provide street sweeping and vacuuming including the use of self-propelled and walk-behind equipment to remove sediment from streets and roadway, and to clean paved surfaces in preparation for final paving, all in accordance with recommendations of BMP SE-7.
11. "Storm Drain Inlet Protection" (SE-10) to reduce sediment entering the storm drain inlet by providing protection measures that temporarily pond runoff before it enters the storm drain. Contractor shall provide appropriate inlet protection in accordance with recommendations of BMP SE-10.

The ESCCP shall be developed in accordance with all applicable requirements of the Construction General Permit. The Contractor may use the California Stormwater Quality Association (CASQA) SWPPP Template as

a reference tool; however, use of the CASQA template is not mandatory. If the Contractor chooses to use another format, the ESCCP must still include all elements required by the Construction General Permit.

13.3 BASIS OF PAYMENT

13.3.1 13-3.1

Payment for Erosion, Sediment, and Chemical Control Plan will be made based on, but not limited to, the following: preparing, completing, and submitting the ESCCP and any associated documents; amending and administering the ESCCP to conform to the Contractor's actual construction practices during their course of work and for the entire Contract duration; providing all labor, materials, hauling, disposal of material, tools, equipment, and incidentals for any additional BMP's not shown or identified in the accepted ESCCP which may be required to comply with the requirements of the regulatory permits or when requested by the APM.

Payment will be made under:

Bid Item 2a:	Erosion, Sediment and Chemical Control Plan - Airside, lump sum
Bid Item 2b:	Erosion, Sediment and Chemical Control Plan - Landside, lump sum

END OF SPECIFICATION 13

14 DUST CONTROL

14.1 CONSTRUCTION METHODS

Throughout all phases of construction, including suspension of Work, and until acceptance, the Contractor shall keep the Work site clean and free from rubbish and debris. Rubbish and debris collected on the Work site shall only be stored in roll-off, enclosed containers prior to disposal. Stockpiles of such will not be allowed.

The Contractor shall ensure there is no spillage along haul routes. Any such spillage shall be removed immediately, and the area cleaned.

Should the Contractor fail to keep the Work site free from rubbish and debris, the APM may suspend the Work until the condition is corrected.

Dust control shall hereby be defined as the elimination and/or control of dirt, dust, mud and debris from propagating or spreading onto properties, private or public, adjacent to the Project and Contractor's work areas.

No separate payment will be made for any work performed or material used to control dust resulting from the Contractor's performance of the work, or by public traffic, either inside or outside the right-of-way.

Construction activity will take place in an airport environment. Dust Control shall be strictly enforced. Contractor shall at all times keep a water truck or other equipment at the job site in working order capable of performing dust control for the duration of the Contract period, while there is an open or active Task Order. The Contractor shall provide and operate a self-loading motor sweeper equipped with spray nozzles, as necessary or appropriate, at locations and times required to ensure effective dust control, and as directed by the APM. Cost for furnishing and operating sweeper (including those instances in addition to the minimum requirements) shall be included in the Unit Price for Dust Control and no additional compensation will be allowed, therefore.

Performing the minimum dust control required by the Contract will in no way relieve the Contractor from their responsibility for providing adequate dust control measures.

14.2 BASIS OF PAYMENT

Full compensation for conforming to the requirements of Dust Control including all labor, equipment, tools, materials, and incidentals shall be considered as included in the Day Unit Price for Dust Control.

Bid Item 2c: Dust Control, per day

END OF SPECIFICATION 14

15 LOW-PROFILE BARRICADES

15.1 GENERAL

This work shall consist of placing, removing and replacing low profile barricades and shall conform to FAA Advisory Circular 150/5370-2G Operational Safety on Airports During Construction, including steady burning or flashing red solar powered light spaced at no more than 10 feet, as approved by the APM.

15.2 BASIS OF PAYMENT

15.2.1

Payment for placement, removal and replacing of low-profile barricades conforming to the requirements shall be included but are not limited to, the following: overhead and profit, furnishing all materials, all preparation, delivering, placing, removing and replacing, and for all labor, equipment, tools and incidentals necessary to conform to the specification.

Bid Item 33: Low Profile Barricade, per each

END OF SPECIFICATION 15

16 SECTION 60 CONTROL OF MATERIALS

60-01 Source of supply and quality requirements.

The materials used in 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 Contractor shall furnish documentation to the APM as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

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

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

60-02 Samples, tests, and cited specifications. All materials used in the work shall be inspected, tested, and approved by the APM before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the APM shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the APM, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner 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.

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. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the APM. 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 Contractor's representative at their request after review and approval of the APM.

A copy of all Contractor QC test data shall be provided to the APM daily, along with printed reports, in electronic and an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the APM showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP) as required by the specifications.

60-03 Certification of compliance/analysis (COC/COA). The APM may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be 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. The COA is the manufacturer's COC and includes all applicable test results.

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 APM.

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the 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.

The APM shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

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

60-04 Plant inspection. The APM or their 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 acceptance of the material or assembly.

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

- a. The APM shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- b. The APM 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.
- c. If required by the APM, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

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 APM shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

60-05 Hollywood Burbank Airport Project Manager field office. APM field office is not required.

60-06 Storage of materials. Materials shall be stored 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 to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the APM. 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 and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the APM. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The

Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish with the APM 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 Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 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 Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the APM.

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

60-08 Owner furnished materials. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the specified location.

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

After any Owner-furnished material has been delivered to the specified location, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

17 ITEM C-100 CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)

17.1

100-1 General. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) 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 Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

- a. Provide qualified personnel to develop and implement the CQCP.
- b. Provide for the production of acceptable quality materials.
- c. Provide sufficient information to assure that the specification requirements can be met.
- d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the APM. No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the APM or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the APM must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the APM on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

- a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.
- b. Discussion of the QA program.
- c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.
- d. Establish regular meetings to discuss control of materials, methods and testing.
- e. Establishment of the overall QC culture.

100-1.1 Submittals. Prior to beginning work, the Contractor shall submit the following:

- 1. Contractor's Quality Control Program

100-2 Description of program.

a. General description. The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

b. Contractor Quality Control Program (CQCP). The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the APM prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the APM for review and approval at least 10 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the APM prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following:

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

100-3 CQCP organization. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used 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 CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Including the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

(1) Professional Engineer with one (1) year of airport paving experience.

(2) Engineer-in-training with two (2) years of airport paving experience.

(3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.

(4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes follow contract specifications. The CQCPA must report directly to the principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project if person can be at the job site within two (2) hours after being notified of a problem.

b. QC technicians. A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA 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 paragraph 100-6.

(2) Performance of all QC tests as required by the technical specifications and paragraph 100-8.

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

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

c. Staffing levels. The Contractor shall provide sufficient qualified QC 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 CQCP shall state where different technicians will be required for different work elements.

100-4 Project progress schedule. Critical QC activities must be shown on the project schedule as required by FAA General Provisions Section 80, paragraph 80-03, *Execution and Progress*.

100-5 Submittals schedule. The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing

can be developed in a spreadsheet format and shall include as a minimum:

- a. Specification item number
- b. Item description
- c. Description of submittal
- d. Specification paragraph requiring submittal
- e. Scheduled date of submittal

100-6 Inspection requirements. QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the feature of work. Inspections shall include the following minimum requirements:

a. During plant operation for material production, QC test results and periodic inspections shall be used 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 used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

b. During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used 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 CQCP shall document how these and other QC functions will be accomplished and used.

100-7 Contractor QC testing facility.

a. For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

1.08.1.3 Equipment Calibration and Checks;

2.08.1.9 Equipment Calibration, Standardization, and Check Records;

3.08.1.12 Test Methods and Procedures

b. For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, *Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation*:

4.07 Test Methods and Procedures

5.08 Facilities, Equipment, and Supplemental Procedures

100-8 QC testing plan. As a part of the overall CQCP, the Contractor shall implement a QC 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 QC tests that the

Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

- a. Specification item number (e.g., P-401)
- b. Item description (e.g., Hot Mix Asphalt Pavements)
- c. Test type (e.g., gradation, grade, asphalt content)
- d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (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)
- g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The APM shall be provided with the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-9.

100-9 Documentation. The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC 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 APM daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

a. Daily inspection reports. Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC 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) Summary of any necessary corrective actions

(7) Safety inspection.

(8) Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests 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 QC technician and the CQCPA. The APM shall be provided with at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

b. Daily test reports. The Contractor shall be responsible for establishing a system that will record all QC 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
- (9) Retests

Test results from each day's work period shall be submitted to the APM prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

100-10 Corrective action requirements. The CQCP 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 CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

100-11 Inspection and/or observations by the APM. All items of material and equipment are subject to inspection and/or observation by the APM at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items

of materials, equipment and work in place shall be subject to inspection and/or observation by the APM at the site for the same purpose.

Inspection and/or observations by the APM does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

100-12 Noncompliance.

- a. The APM will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.
- b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the APM will recommend the Owner take the following actions:
 - (1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or
 - (2) Order the Contractor to stop operations until appropriate corrective actions are taken.

17.2 METHOD OF MEASUREMENT

100-13 Basis of measurement and payment. Not Used

17.3 BASIS OF PAYMENT

100-14 Payment. Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP and shall be considered incidental to other work items and no separate payment shall be made.

17.4 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

END OF ITEM C-100

18 ITEM C-102 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

18.1 DESCRIPTION

102-1 General. This item shall consist of temporary control measures as shown on the plans or as ordered by the APM during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods, and as required by the approved Storm Water Pollution Prevention Plan (SWPPP).

Temporary erosion control shall be in accordance with the approved erosion control plan (SWPPP); the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2G, *Operational Safety on Airports*

During Construction. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

The Contractor shall prepare and implement SWPPP in accordance with the Statewide General permit requirements during construction of this project. The Contractor shall also include Chemical Control Plan per California Stormwater Quality Association (CQSQA) as required.

102-1.2 Submittal. The Contractor shall submit the following:

- a. Storm Water Pollution Prevention Plan.

18.2 MATERIALS

102-2.1 Grass. Grass that will not compete with the grasses sown later for permanent cover shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

102-2.2 Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials. Mulches shall not create a wildlife attractant.

102-2.3 Fertilizer. Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

102-2.4 Slope Drains. Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.

102-2.5 Silt Fence. Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

102-2. Other. All other materials shall meet commercial grade standards and shall be approved by the APM before being incorporated into the project.

18.3 CONSTRUCTION REQUIREMENTS

102-3.1 General. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The APM shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the APM.

102-3.3 Construction Details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The APM shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the APM.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the APM. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the APM, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The APM may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

102-3.4 Installation, Maintenance and Removal of Silt Fence. When silt fences are necessary, silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the APM.

18.4 METHOD OF MEASUREMENT

102-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the APM. Completed and accepted work will be paid for at the lump sum contract price not to exceed five percent (5%) of total task order.

18.5 BASIS OF PAYMENT

102-5.1 Accepted temporary water pollution, soil erosion, and siltation control work ordered by the APM will be paid as lump sum.

This shall be full compensation for furnishing all materials, including Storm Water Pollution Prevention Plan (SWPPP) and updating the Plan during the construction period as required, and for all preparation, hauling, disposal of materials, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Bid Item 2a: Erosion, Sediment and Chemical Control Plan (Airside), lump sum

Bid Item 2b: Erosion, Sediment and Chemical Control Plan (Landside)), lump sum

18.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2 *Operational Safety on Airports During Construction*

ASTM International (ASTM)

ASTM D6461 *Standard Specification for Silt Fence Materials*

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

19 ITEM C-105 MOBILIZATION

105-1 Description. This item of work shall consist of, 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.

Mobilization shall also consist of obtaining all required insurance, bonds and permits; preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; preparation of a construction schedule; facilities as required by the Contract for work on the project; badging and training of flaggers, escorts and other employees as specified herein; and all other work which must be performed or cost incurred prior to beginning work on the various contract items at the project site and all work associated with demobilization of the project.

105-2 Mobilization

Mobilization shall include the following principal items:

- a. Insurance as required by Special Provisions for Liability Insurance and for Worker's Compensation Insurance.
- b. Bonds as required by Special Provisions for Contract Bonds.
- c. Permits for this project as required by Special Provisions for Permits
- d. The Contractor's approved Baseline Construction Schedule as required by Special Provisions for Contractor's Construction Schedule and Reports.
- e. Contractor's Operation and Storage Yard (Laydown / Staging Area).
- f. Moving onto the Site all equipment required for the construction.
- g. Posting all required OSHA notices and establishing on-site safety programs.
- h. Submittals of Shop and Coordination Drawings for the construction.
- i. Security badging and training of all flaggers, escorts and other employees as required for the construction.
- j. Submission of all required Notice of Intent documents, notifications, inspection reports, sampling results, annual reports, etc., to the California State Water Resources Control Board via SMARTS for projects over 1 acre. Smaller projects are required to comply with Risk Level 1 from the Construction Stormwater Permit, with inspections reports submitted to the APM.

105-3 Demobilization. Demobilization provides for all required work associated with all administrative requirements and Demobilization of the construction laydown area including but not limited to restoration work and operations necessary for the movement of personnel equipment, supplies, and incidentals to the project site; obtaining approval of various project submittals, close-out documents, retrieval of site field office(s) and other facilities; final site survey and as-built drawings; all pursuant to the Contract Documents

and as necessary to close-out the project. Demobilization shall also include removal of construction facilities; including all utilities, equipment off the Site, and final cleanup of the Site after completion of the Project to the satisfaction of the APM. Contractor shall file a Notice of Termination to the California State Water Resources Control Board for project site over 1 acre.

105-4 Posted notices. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: 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. **Links to the posters available at:** <https://www.faa.gov/airports/engineering/>

105-5 APM field office. An APM field office is not required.

19.1 METHOD OF MEASUREMENT

105-6 Basis of measurement and payment. Payment for Mobilization shall be made as lump sum. Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.

d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

No separate payment shall be made for demobilization. The cost of demobilization shall be included in mobilization item.

This price shall be full compensation for furnishing all materials, labor, equipment and tools necessary to complete mobilization and demobilization.

19.2 BASIS OF PAYMENT

105-7 Payment will be made under:

- Item 1a: Mobilization (Airside), per lump sum
- Item 1b: Mobilization (Landside), per lump sum

19.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster
United States Department of Labor, Wage and Hour Division (WHD)
WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

20 ITEM C-110 METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

20.1 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 Contractor'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 rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-1 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 test 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 test values within a lot

$x_1, x_2, \dots, x_n$ = Individual subplot test values

n = Number of subplot test values

- 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 test values in the set

$d_1, d_2, \dots, d_n$ = Deviations of the individual subplot test values $x_1, x_2, \dots$ from the average value $\bar{X}$

that is: $d_1 = (x_1 - \bar{X}), d_2 = (x_2 - \bar{X}) \dots d_n = (x_n - \bar{X})$
 n = Number of subplot test values

f. For single sided specification limits (i.e., L only), compute the Lower Quality Index QL by use of the following formula:

$$QL = (\bar{X} - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with QL, using the column appropriate to the total number (n) of measurements. If the value of QL falls between values shown on the table, use the next higher value of PWL.

g. For double-sided specification limits (i.e., L and U), compute the Quality Indexes QL and QU by use of the following formulas:

$$QL = (\bar{X} - L) / S_n$$

20.1.1.1.1.1.1 and

$$QU = (U - \bar{X}) / S_n$$

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 QL and QU, using the column appropriate to the total number (n) of measurements, and determining the percent of material above PL and percent of material below PU for each tolerance limit. If the values of QL fall between values shown on the table, use the next higher value of PL or PU. Determine the PWL by use of the following formula:

$$PWL = (PU + PL) - 100$$

Where: PL = percent within lower specification limit

PU = percent within upper specification limit

20.2 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.

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

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

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

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 QL for the lot. (L=96.3)

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

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

$$QL = 1.4348$$

5. Determine PWL by entering Table 1 with QL= 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.

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

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

$$X = 3.57\%$$

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 QL for the lot. (L= 2.0)

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

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

$$QL = 1.3992$$

5. Determine PL by entering Table 1 with QL = 1.41 and n =

$$4. PL = 97$$

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

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

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

$$QU = 1.2702$$

7. Determine PU by entering Table 1 with QU = 1.29 and n =

$$4. PU = 93$$

8. Calculate Air Voids PWL

$$PWL = (PL + PU) - 100$$

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

20.3 EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

Project: Example Project

Test Item: Item P-401, Lot A.

20.3.1 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. From ASTM E178, Table 1, for n=4 an upper 5% significance level, 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 (measurement - average)/(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 (average - measurement)/(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 1.435 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 $(97.95 + 1.463 \times 1.15) = 99.63\%$

OR

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

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

Percent Within Limits (PL and PU)	Positive Values of Q (QL and QU)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.800 8	1.888 8	1.952 0	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.698 2	1.761 2	1.805 3	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.618 1	1.666 1	1.699 3	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.549 7	1.587 1	1.612 7	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.488 7	1.518 1	1.538 1	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.432 9	1.456 1	1.471 7	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.381 0	1.399 1	1.411 2	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.332 3	1.346 1	1.355 4	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.286 0	1.296 4	1.303 2	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.241 9	1.249 2	1.254 1	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.199 5	1.204 3	1.207 5	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.158 7	1.161 3	1.163 0	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.119 2	1.119 9	1.120 4	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.080 8	1.080 0	1.079 4	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.043 5	1.041 3	1.039 9	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.007 1	1.003 7	1.001 5	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.971 5	0.967 1	0.964 3	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.936 7	0.931 5	0.928 1	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.902 5	0.896 6	0.892 8	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.869 0	0.862 5	0.858 3	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.836 0	0.829 1	0.824 5	0.8214	0.8192

78	0.8897	0.8400	0.8160	0.803 6	0.796 2	0.791 5	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.771 6	0.764 0	0.759 0	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.740 1	0.732 2	0.727 1	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.708 9	0.700 9	0.695 8	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.678 1	0.670 1	0.664 9	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.647 7	0.639 6	0.634 4	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.617 6	0.609 5	0.604 4	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.587 8	0.579 8	0.574 7	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.558 2	0.550 4	0.545 4	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.529 0	0.521 3	0.516 4	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.499 9	0.492 4	0.487 7	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.471 0	0.463 8	0.459 2	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.442 4	0.435 5	0.431 0	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.413 9	0.407 3	0.403 0	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.385 6	0.379 3	0.375 3	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.357 5	0.351 5	0.347 7	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.329 5	0.323 9	0.320 3	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.301 6	0.296 4	0.293 1	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.273 8	0.269 1	0.266 0	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.246 1	0.241 8	0.239 1	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.218 6	0.214 7	0.212 2	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.191 1	0.187 7	0.185 5	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.163 6	0.160 7	0.158 8	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.136 3	0.133 8	0.132 2	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.109	0.107	0.105	0.1049	0.1042

				0	0	7		
53	0.1087	0.0900	0.0843	0.081 7	0.080 2	0.079 3	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.054 4	0.053 4	0.052 8	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.027 2	0.026 7	0.026 4	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.000 0	0.000 0	0.000 0	0.0000	0.0000

Percent Within Limits (PL and PU)	Negative Values of Q (QL and QU)							
	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	-	-	-	-	-	-	-0.4257
33	-0.5878	-	-	-	-	-	-	-0.4537
32	-0.6187	-	-	-	-	-	-	-0.4820
31	-0.6490	-	-	-	-	-	-	-0.5105
30	-0.6787	-	-	-	-	-	-	-0.5394
29	-0.7077	-	-	-	-	-	-	-0.5686
28	-0.7360	-	-	-	-	-	-	-0.5982
27	-0.7636	-	-	-	-	-	-	-0.6282
26	-0.7904	-	-	-	-	-	-	-0.6587
25	-0.8165	-	-	-	-	-	-	-0.6896
24	-0.8417	-	-	-	-	-	-	-0.7211
23	-0.8662	-	-	-	-	-	-	-0.7531
22	-0.8897	-	-	-	-	-	-	-0.7858
21	-0.9124	-	-	-	-	-	-	-0.8192
20	-0.9342	-	-	-	-	-	-	-0.8533
19	-0.9550	-	-	-	-	-	-	-0.8882
18	-0.9749	-	-	-	-	-	-	-0.9241
17	-0.9939	-	-	-	-	-	-	-0.9610
16	-1.0119	-	-	-	-	-	-	-0.9990
15	-1.0288	-	-	-	-	-	-	-1.0382
14	-1.0448	-	-	-	-	-	-	-1.0789
13	-1.0597	-	-	-	-	-	-	-1.1212
12	-1.0736	-	-	-	-	-	-	-1.1653
11	-1.0864	-	-	-	-	-	-	-1.2115
10	-1.0982	-	-	-	-	-	-	-1.2602

		1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	
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

20.4 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM E178

Standard Practice for Dealing with Outlying Observations

END OF ITEM C-110

21 ITEM P-101 PREPARATION/REMOVAL OF EXISTING PAVEMENTS

21.1 DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement (reinforced and non-reinforced concrete pavement), cold milling (grinding) of existing pavement, removal of existing asphalt cement concrete and stabilized base course, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

21.2 EQUIPMENT AND MATERIALS

101-2 All equipment and materials shall be specified here and in the following paragraphs or approved by the APM. The equipment shall not cause damage to the pavement to remain in place.

21.3 CONSTRUCTION

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

101-3 Removal of existing pavement.

a. Concrete pavement removal. Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. Concrete pavement shall be disposed of off Airport property and in accordance with Federal, State, and Local laws and regulations. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the APM.

The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Spall and underbreak repair shall be in accordance with the plans. Any underlying material that is to remain in place, shall be recompact and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.

Repair details for spalls, underbreaks, and remaining underlying materials on the plans shall conform to Airfield Pavement Repairs Specifications.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. Asphalt pavement shall be disposed of off Airport property and in accordance with Federal, State, and Local laws and regulations.

c. Repair or removal of Base, Subbase, and/or Subgrade. All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the APM. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the APM. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed 1/4 inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

Cracks and joints may be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in the following table.

21.3.1 Gradation:

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	90-100
No. 16 (1.18 mm)	65-90
No. 30 (600 µm)	40-60
No. 50 (300 µm)	25-42
No. 100 (150 µm)	15-30
No. 200 (75 µm)	10-20

Up to 3% cement can be added to accelerate the set time. The mixture shall not contain more than 20% natural sand without approval in writing from the APM.

The proportions of asphalt emulsion and aggregate shall be determined in the field and may be varied to facilitate construction requirements. Normally, these proportions will be approximately one part asphalt emulsion to five parts aggregate by volume. The material shall be poured or placed into the joints or cracks and compacted to form a voidless mass. The joint or crack shall be filled to within +0 to -1/8 inches (+0 to -3 mm) of the surface. Any material spilled outside the width of the joint shall be removed from the pavement surface prior to constructing the overlay. Where concrete overlays are to be constructed, only the excess joint material on the pavement surface and vegetation in the joints need to be removed.

101-3.3 Removal of Foreign Substances/contaminates prior to overlay, seal-coat or remarking. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 95% of rubber and 95% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the APM in the field during construction.

Chemicals, high-pressure water or other methods with prior written approval from APM may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the

aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the APM that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the APM.

Removal of foreign substances shall not proceed until approved by the APM. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed off airport property.

For removal of rubber deposits to improve skid resistance or obliterate traffic markings where a new overlay is not constructed, the Contractor shall also comply with the requirements of AC 150/5320-12C, Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces and Section A8, Rubber Removal From Airfield Pavements.

a. Sandblasting. Sandblasting is not allowed.

101-3.4 Concrete spall or failed asphaltic concrete pavement repair.

a. Repair of concrete spalls in areas to be overlaid with asphalt. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the APM. The perimeter of the repair shall be saw cut a minimum of 2 inches (50 mm) outside the affected area and 2 inches (50 mm) deep. The deteriorated material shall be removed to a depth where the existing material is firm or cannot be easily removed with a geologist pick. The removed area shall be filled with asphalt mixture with aggregate sized appropriately for the depth of the patch. The material shall be compacted with equipment approved by the APM until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches (100 mm) in depth. This method of repair applies only to pavement to be overlaid.

Concrete spall shall conform to the Airfield Pavement Repairs Specifications.

Asphalt mix pavement repair of concrete pavement should only be allowed to depths less than 1/3 of the PCC pavement thickness.

b. Asphalt pavement repair. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the APM. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

101-3.5 Cold Milling. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport property by the Contractor unless otherwise used on the project or stockpiled as specified on the plans and these specifications. When stockpiling of material is required, the stockpiled material shall be at the location and maximum height shown on the plans within the airport property. Maximum size of the cold milling material shall be 2 inches when stockpiled at the airport. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.

a. Patching. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The APM shall layout the area to be milled with a straightedge in increments of 1-foot widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of their negligence, shall be

repaired by the Contractor at the Contractor's Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport by the Contractor unless otherwise used on the project or stockpiled in areas designated on the plans.

c. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall

b. Repair joints and cracks in accordance with paragraph 101-3.2.

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the APM. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the APM, that the method used cleans the joint and does not damage the joint.

101-3.8.1 Removal of Existing Joint Sealant. All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch (2 mm) from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

101-3.8.2 Cleaning prior to sealing. Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

101-3.8.3 Joint sealant. Joint material and installation will be in accordance with Item P-605 and as indicated on the plans.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the APM, that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 Preparation of Crack. Widen crack with router by removing a minimum of 1/16 inch (2 mm) from each side of crack. Route small cracks and joints to provide reservoir for sealant per manufacture's recommendation. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 Removal of Existing Crack Sealant. Existing sealants will be removed by routing. Following routing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 Crack Sealant. Crack sealant material and installation will be in accordance with Item P-605.

101-3.9.3 Removal of Pipe and other Buried Structures.

a. Removal of Existing Pipe Material. Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D1557.

b. Removal of Inlets/Manholes. Where indicated on the plans or as directed by the APM, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D1557 or as required by typical sections, and when outside of paved areas must be compacted to 95% of ASTM D698.

c. Removal of Utilities. Coordinate with the owners of the utilities to be removed to determine the termination, plugging or capping requirements for cutting and removal of the utility. All utility piping and conduits shall be completely removed prior to the construction of the new improvements unless noted otherwise on the plans or in the specifications or unless directed otherwise by the APM.

The Contractor is responsible for accurately locating and protecting the utilities that have been shown on the plans. The Contractor shall be aware that not all utilities may have been located and that he shall employ whatever means he deems appropriate to identify and locate existing utilities and protect these utilities during construction.

d. Removal of Concrete Foundations, Utility Structures and Hardstands. The concrete foundations abandoned fence posts, utility structures, drainage headwalls, curbs and hardstands shall be removed to a minimum of 2 feet below existing grade, unless otherwise shown on the plans. The Contractor's removal operation shall not cause damage to cables, utility ducts, pipelines, or drainage structures under the pavement. Any damage shall be repaired by the Contractor at no expense to the airport.

101-3.10 Protect in Place. Utilities or other structures to remain in place shall be protected at all times during the demolition of overlying or adjacent pavement, utilities, or other items. The Contractor shall employ appropriate means to ensure that no damage is done to these facilities during demolition operations. Any damage of pavement, structures or utilities to remain in place caused by the Contractor's operations shall be repaired at Contractor's expense.

The existing electrical conduits and other utilities that do not have the minimum coverage shall be protected by installing reinforced concrete protection slab over the lines as shown on the plans or as directed by the APM.

21.4 METHOD OF MEASUREMENT

101-4.1 Measurement. No separate measurement and payment shall be made for the work performed under this item of work except as provided below bid items but the work covered by this section shall be considered as a subsidiary obligation of the Contractor and covered under the other contract items.

101-4.2 Pavement removal. The unit of measurement for pavement removal shall be the number of cubic yards removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No

direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal.

101-4.3 Cold milling. The unit of measure for cold milling shall be four (4) inches of milling per cubic yard. The location and average depth of the cold milling shall be as shown on the plans. If the initial cut does not correct the condition, the Contractor shall re-mill the area and will be paid for the total depth of milling.

21.5 BASIS OF PAYMENT

101-5.1 Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item 34:	Pavement Removal, per cubic yard
Item 35:	Cold Milling, per cubic yard

21.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements. ASTM International (ASTM)
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

22 ITEM P-151 CLEARING AND GRUBBING

22.1 DESCRIPTION

151-1.1 This item shall consist of clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the APM.

a. Clearing shall consist of the cutting and removal of all trees, stumps, brush, logs, hedges, the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.

b. Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the APM is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

c. Tree Removal. Tree Removal shall consist of the cutting and removal of isolated single trees or isolated groups of trees, and the grubbing of stumps and roots. The removal of all the trees of this classification shall be in accordance with the requirements for the particular area being cleared.

22.2 CONSTRUCTION METHODS

151-2.1 General. The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the APM and/or Contractor as indicated on the plans.

The removal of existing structures and utilities required to permit orderly progress of work shall be accomplished by local agencies, unless otherwise shown on the plans. Whenever a telephone pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated, the Contractor shall advise the APM who will notify the proper local authority or owner to secure prompt action.

151-2.1.1 Disposal. All materials removed by clearing or by clearing and grubbing shall be disposed of outside the Airport's limits at the Contractor's responsibility, except when otherwise directed by the APM. As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction and all other materials not considered suitable for use elsewhere, shall be disposed of by the Contractor. In no case, shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the APM and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits, the Contractor shall obtain and file with the APM permission in writing from the property owner for the use of private property for this purpose.

151-2.1.2 Blasting. Blasting shall not be allowed.

151-2.2 Clearing. The Contractor shall clear the staked or indicated area of all materials as indicated on the plans. Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner. To minimize damage to trees that are to be left standing, trees shall be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed.

The trees, stumps, and brush shall be cut flush with the original ground surface. The grubbing of stumps and roots will not be required.

Fences shall be removed and disposed of as directed by the APM. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a location designated by the APM if the fence is to remain the property of a local owner or authority.

151-2.3 Clearing and grubbing. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials as indicated on the plans, shall be removed to at least 4 inches below the existing grade, except where embankments exceeding 3-1/2 feet (105 cm) in depth will be constructed outside of paved areas. For embankments constructed outside of paved areas, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off flush with the original ground and allowed to remain. Tap roots and other projections over 1-1/2 inches (38 mm) in diameter shall be grubbed out to a depth of at least 18 inches (0.5 m) below the finished subgrade or slope elevation.

Any miscellaneous structures that are shown on the plans to be removed shall be demolished or removed, and all materials shall be disposed of by removal from the site. The cost of removal is incidental to this item. The remaining or existing foundations, wells, cesspools, and like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet (60 cm) below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material that cannot be used in backfill shall be removed and disposed of at the Contractor's expense. The holes or openings shall be backfilled with acceptable material and properly compacted.

All holes in embankment areas remaining after the grubbing operation shall have the sides of the holes flattened to facilitate filling with acceptable material and compacting as required in Item P-152. The same procedure shall be applied to all holes remaining after grubbing in areas where the depth of holes exceeds the depth of the proposed excavation.

22.3 METHOD OF MEASUREMENT

151-3.1 The quantities of clearing as shown by the limits on the plans shall be the number of square yards of land specifically cleared.

151-3.2 The quantities of clearing and grubbing as shown by the limits on the plans shall be the number of square yards of land specifically cleared and grubbed.

22.4 BASIS OF PAYMENT

151-4.1 Payment shall be made at the contract unit price per square yard for clearing. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

151-4.2 Payment shall be made at the contract unit price per square yard for clearing and grubbing. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 36: Clearing, per square yard or fractions thereof

Item 37: Clearing and Grubbing, per square yard or fractions thereof

END OF ITEM P-151

23 ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

23.1 DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 Classification. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature.

152-1.3 Unsuitable excavation. Unsuitable material shall be disposed off airport property and in accordance with Federal, State, and Local laws and regulations.

Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the APM.

23.2 CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the APM. All unsuitable material shall be disposed off Airport property and in accordance with Federal, State, and Local laws and regulations.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the APM notified per FAA Section 70, paragraph 70-20. At the direction of the APM, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the APM, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 Excavation. No excavation shall be started until the work has been staked out by the Contractor and the APM obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and APM shall agree that the original ground lines shown on the original topographic mapping are accurate or agree to any adjustments made to the original ground lines.

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot (30 mm) of the stated elevations for ground surfaces, or within 0.04 foot (12 mm) for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the APM in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the APM. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the APM. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the APM shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches below the subgrade or to the depth specified by the APM. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed off the airport property. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans or as directed by the APM. Undercutting will be paid as unclassified excavation.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the APM. All over-break shall be graded or removed by the Contractor and disposed of as directed by the APM. The APM shall determine if the displacement of

such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the APM determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor unless otherwise indicated on the plans. All existing foundations shall be excavated at least 2 feet below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the APM. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation.

There are no borrow sources within the boundaries of the airport property.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the APM. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top of subgrade shall be compacted to the depths and densities indicated on the plans as determined by ASTM D 1557. Unless otherwise noted on the Plans, the top twelve inches of subgrade shall be compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D 1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the APM, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The APM must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the APM. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the APM.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the APM. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment, nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within $\pm 2\%$ of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The Contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D 1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Contractor for every 1,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the APM.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils, unless otherwise noted on the plans, as determined by ASTM D 1557. Under all areas to be paved, the embankments shall be compacted to a depth of **12 inches** and to a density of not less than 95 percent of the maximum density, unless otherwise noted on the plans, as determined by ASTM D 1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, where seeding is specified, no compaction will be required on the top 4 inches (100 mm) which shall be prepared for a seedbed in accordance with FAA Item T-901.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. The Contractor's laboratory shall perform all density tests in the APM's presence and provide the test results upon completion to the APM for acceptance. If the specified density is not attained, the area represented by the test or as designated by the APM

shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the APM and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the APM.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.9 Proof rolling. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. the subgrade area shall be proof rolled with a 20 ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi or a 15 ton Proof Roller with tires spaced not more than 32 inches (0.8 m) on-center with tires inflated to 100 psi in the presence of the APM. Apply a minimum of **two** coverage, or as specified by the APM, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item. Notify the APM a minimum of three (3) days prior to proof rolling. Proof rolling shall be performed in the presence of the APM. No separate measurement or payment shall be made for proof rolling. All time, labor, materials and equipment required to perform Proof Rolling shall be considered incidental and included in other items of work.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 100 percent of the maximum dry density as determined by ASTM D1557. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

The material to be compacted shall be within $\pm 2\%$ of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the $\frac{3}{4}$ inch (19.0 mm) sieve, follow the methods in ASTM D1557 **or** procedures in AASHTO T180 Annex

for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of **1,000** S.Y. of subgrade. All quality assurance testing shall be done by the Contractor's laboratory in the presence of the APM, and density test results shall be furnished upon completion to the APM for acceptance determination.

The in-place field density shall be determined in accordance with ASTM D1556 **or** ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the APM and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the APM.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the APM. The Contractor shall perform all final smoothness and grade checks in the presence of the APM. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

- a. Smoothness.** The finished surface shall not vary more than $\pm 1/2$ inch (12 mm) when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

- b. Grade.** The grade and crown shall be measured on a 50-foot grid and shall be within +/-0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to be placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. Not used.

152-2.15 Utility Trench Excavation and Backfilling.

- a. Trench Excavation:** Unless otherwise shown on the plans, typical sections or the referenced specifications, provide vertical trench and shoring as required. Unless otherwise specified, excavated materials that are deemed by APM to be unsuitable for use in backfill or embankments shall be removed and disposed of off airport property and in accordance with Federal, State, and Local laws and regulations at no additional cost.
- b. Backfilling and Compaction:** Unless otherwise shown on the plans, typical sections or the referenced specifications, trench shall be backfilled with approved material not larger than 3 inches in diameter spread in loose lifts not exceeding 8 inches deep prior to compaction. Compact each lift prior to placement of succeeding lifts. Compact each layer of backfill material to not less than 95 percent of maximum density for noncohesive soils, and 90 percent of maximum density for cohesive soils as determined by ASTM D 1557. Unless otherwise indicated on the plans, the top 12 inches of trench under areas to be paved shall be compacted to a density of not less than **100** percent of the maximum dry density as determined by ASTM D1557. Each layer of fill construction will be tested, and successive layers will not be allowed to be placed unless permission is granted by the APM.

23.3 METHOD OF MEASUREMENT

152-3.0 Measurement for payment specified by the cubic yard shall be computed by the average end areas of design cross sections or the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the APM.

152-3.1 Not used.

152-3.2 The quantity of unclassified excavation to be paid for shall be the number of cubic yards measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.3 The quantity of import borrow excavation to be paid for shall be the number of cubic yards measured in its final position.

152-3.4 The quantity of over-excavation shall be paid for on the basis of the number of cubic yards measured in its original position.

152-3.5 The quantity of subgrade preparation to be paid for will be measured by the number of square yards of subgrade prepared to the specified depth and density and accepted by the APM.

23.4 BASIS OF PAYMENT

152-4.2 For “Unclassified Excavation” payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, and for all preparation including excavation, hauling, and disposal of material off airport property, and for all labor, equipment, tools, and incidentals necessary to complete the item.

152-4.3 For “Import Borrow” payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, and for all preparation including excavation, hauling, and placing in final position, compaction and for all labor, equipment, tools, and incidentals necessary to complete the item.

152-4.4 For “Over-Excavation” payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, and for all preparation including excavation, hauling, and disposal of material off airport property, and for all labor, equipment, tools, and incidentals necessary to complete the item.

152-4.5 For “Subgrade Preparation” payment shall be made at the contract unit price per square yard. This price shall be full compensation for furnishing all materials, and for all preparation and finishing of the surface, compaction and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 38:	Unclassified Excavation, per cubic yard
Item 39:	Import Barrow, per cubic yard
Item 40:	Over-Excavation, per cubic yard
Item 41:	Subgrade Preparation, per cubic yard

23.5 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.5-kg (10-lb) Rammer and a 457-mm (18-in.) Drop ASTM International (ASTM)
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design U.S. Department of Transportation.
FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

24 ITEM P-153 CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

24.1 DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the APM.

153-1.2 Submittals. Prior to commencing work in this item and delivery of materials to the job site, the Contractor shall submit the following:

- a. Mix design including test reports and/or certificates of compliance for each required mix for aggregates, water, cement and admixtures.

24.2 MATERIALS

153-2.1 Materials.

a. Cement. Cement shall conform to the requirements of ASTM **150 Type II** or other Type depending on the site conditions as evaluated by the APM.

b. Fly ash. Fly ash shall conform to ASTM C618, Class C or F.

c. Fine aggregate (sand). Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by weight
3/4 inch (19.0 mm)	100
No. 200 (75 µm)	0 - 12

d. Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

24.3 MIX DESIGN

153-3.1 Proportions. The Contractor shall submit, to the APM, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced for payment until the APM has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. Compressive strength. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi when tested in accordance with ASTM D4832, with no significant strength gain after 28 days.

b. Consistency. Design CLSM to achieve a consistency that will produce an approximate 8-inch (200 mm) diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

24.4 CONSTRUCTION METHODS

153-4.1 Placement.

a. Placement. CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the APM. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. Contractor Quality Control. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and 153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the APM.

c. Limitations of placement. CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C).

153-4.2 Curing and protection

a. Curing. The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the APM if damage to the material is observed.

b. Protection. The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the APM that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 Quality Assurance (QA) Acceptance. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the APM to confirm that the delivered material conforms to the mix design.

24.5 METHOD OF MEASUREMENT

153-5.1 Measurement.

Controlled low-strength material (CLSM) shall be measured by the number of cubic yards as specified, completed, and accepted.

24.6 BASIS OF PAYMENT

153-6.1 Payment.

Controlled low-strength material (CLSM) shall be paid for at the contract unit price per. Payment shall be full compensation for all materials, equipment, labor, and incidentals required to complete the work as specified.

Payment will be made under:

Item 42: Controlled low-strength material (CLSM) - per cubic yard

24.7 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders
ASTM D6103	Flow Consistency of Controlled Low Strength Material (CLSM)

END OF ITEM P-153

25 ITEM P-154 SUBBASE COURSE

25.1 DESCRIPTION

154-1.1 This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course in accordance with these specifications, and in conformity with the dimensions and typical cross-section shown on the plans.

25.2 MATERIALS

154-2.1 Materials. The subbase material shall consist of hard durable particles or fragments of granular aggregates. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with proper blending. The materials from these sources shall meet the requirements for gradation, quality, and consistency. The material shall be free from vegetative matter, excessive amounts of clay, and other objectionable substances; uniformly blended; and be capable of being compacted into a dense, stable subbase.

The subbase material shall exhibit a California Bearing Ratio (CBR) value of at least 20 when tested in accordance with ASTM D1883. The subbase material shall meet the gradation specified in the table below.

Subbase Gradation Requirements:

Sieve designation	Percentage by weight passing sieves	Contractor's Final Gradation	Job Control Grading Band Tolerances ¹ (Percent)
	Subbase Aggregate		
3 inch (75 mm)	100		0
1 1/2 inch (37.5 mm)	100		0
3/4 inch (19.0 mm)	70-100		±10
No. 10 (2.00 mm)	20-100		±10
No. 40 (425 µm)	5-60		±5
No. 200	0-15		±5

(75 μ m)			

¹The “Job Control Grading Band Tolerances” shall be applied to “Contractor’s Final Gradation” to establish the job control grading band.

The portion of the material passing the No. 40 (425 μ m) sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than six (6) when tested in accordance with ASTM D4318.

154-2.2 Sampling and testing.

a. Aggregate base materials. Samples shall be taken by the Contractor per ASTM D75 for initial aggregate subbase requirements and gradation. Material shall meet the requirements in paragraphs 154-2.1. The Contractor shall submit to the APM certified test results showing that the aggregate meets the Material requirements of this section. Tests shall be representative of the material to be used for the project.

b. Gradation requirements. The Contractor shall take at least one aggregate subbase sample per day in the presence of the APM to check the final gradation. Samples shall be taken from the in-place, un-compacted material at sampling locations determined by the APM on a random basis per ASTM D3665. Sampling shall be per ASTM D75 and tested per ASTM C136 and ASTM C117. Results shall be furnished to the APM by the Contractor each day during construction. Material shall meet the requirements in paragraph 154-2.1.

154-2.3 Separation Geotextile. Separation geotextile shall be Class 2 with 0.02 sec⁻¹ permittivity per ASTM D4491; Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

154-2.4 Geogrid. Not used.

25.3 CONSTRUCTION METHODS

154-3.1 General. The subbase course shall be placed where designated on the plans or as directed by the APM. The material shall be shaped and thoroughly compacted within the tolerances specified.

Granular subbases which, due to grain sizes or shapes, are not sufficiently stable to support the construction equipment without movement, shall be mechanically modified to the depth necessary to provide stability as directed by the APM. The mechanical modification shall include the addition of a fine-grained medium to bind the particles of the subbase material sufficiently to furnish a bearing strength, so the course will not deform under construction equipment traffic.

154-3.2 Preparing underlying course. Prior to constructing the subbase course, clean the underlying course or subgrade of all foreign substances. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances in accordance with Item P-152. Correct ruts, soft yielding spots in the underlying courses, and subgrade areas having inadequate compaction and/or deviations of the surface from the specified requirements, by loosening and removing soft or unsatisfactory material, adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D2487, the surface shall be stabilized prior to placement of the overlying course by mixing the overlying course material into the underlying course, and compacting by approved methods. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until the overlying course is placed. The underlying course shall be checked and accepted by the APM before placing and spreading operations are started.

To protect the subgrade and to ensure proper drainage, spreading of the subbase shall begin along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope.

154-3.3 Control Strip. Not used

154-3.4 Placement. The material shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the APM, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted. The material shall not be placed when the underlying course is soft or yielding.

The material shall meet gradation and moisture requirements prior to compaction. Material may be free- draining and the minimum moisture content shall be established for placement and compaction of the material. The material shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

154-3.5 Compaction. The subbase material shall be compacted, adjusting moisture as necessary, to be within $\pm 2\%$ of optimum moisture. The field density of the compacted material shall be at least 100% of the maximum density as specified in paragraph 154-3.9a. If the specified density is not attained, the area of the lift represented by the test shall be reworked and/or re-compact and additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

154-3.6 Weather limitation. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on subbase course shall not be conducted when the subgrade is wet or frozen or the subbase material contains frozen material.

154-3.7 Maintenance. No base or surface course shall be placed on the subbase until the subbase has been accepted by the APM. The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, the Contractor shall verify that materials still meet all specification requirements before placement of additional material. Equipment may be routed over completed sections of subbase course, provided the equipment does not damage the subbase course and the equipment is routed over the full width of the completed subbase course. Any damage to the subbase course from routing equipment over the subbase course shall be repaired by the Contractor at their expense.

154-3.8 Surface tolerance. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compact to grade until the required smoothness and accuracy are obtained and approved by the APM. The Contractor shall perform all final smoothness and grade checks in the presence of the APM. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than $\pm \frac{1}{2}$ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length

of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/-0.05 feet (15 mm) of the specified grade.

154-3.9 Acceptance sampling and testing. The aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yards. Sampling locations will be determined on a random basis per ASTM D3665.

1. Density. The Contractor's laboratory shall perform all density tests in the APM's presence and provide the test results upon completion to the APM for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test shall be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, use methods in ASTM D1557 and the procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles.

a. Thickness. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the APM for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at their expense, base material where depth tests have been taken.

25.4 METHOD OF MEASUREMENT

154-4.1 Subbase course shall be measured by the number of cubic yards of subbase course material placed and compacted to specified density and plan thickness requirements in the completed course. The quantity of subbase course material shall be measured in final position based upon depth tests or cores taken by the Contractor as directed by the APM, at the rate of two tests per each 1200 square yards of subbase course **or** survey of the completed work computed from elevations to the nearest 0.01 foot (3 mm). On individual depth measurements, thicknesses more than 1/2 inch (12 mm) in excess of that shown on the plans shall be considered as the specified thickness plus 1/2 inch (12 mm) in computing the yardage for payment. Subbase materials shall not be included in any other excavation quantities.

154-4.2 Separation geotextile shall be measured by the number of square yards of materials placed and accepted by the APM as complying with the plans and specifications excluding seam overlaps and edge anchoring.

25.5 BASIS OF PAYMENT

154-5.1 Payment shall be made at the contract unit price per cubic yard for subbase course. This price shall be full compensation for furnishing all materials; for all preparation, hauling, and placing of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

154-5.2 Payment shall be made at the contract unit price per square yard for separation geotextile-class 2. The price shall be full compensation for furnishing all labor, equipment, material, anchors, and necessary incidentals.

Payment will be made under:

Item 43:	Subbase Course, per cubic yard
Item 44:	Separation geotextile, per square yard

25.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2,700 kN-m/m ³))
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D4759	Practice for Determining the Specification Conformance of Geosynthetics
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) American Association of State Highway and Transportation Officials (AASHTO) M 288 Geotextile Specification for Highway Applications

END OF ITEM P-154

26 ITEM P-209 CRUSHED AGGREGATE BASE COURSE

26.1 DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross- sections shown on the plans.

26.2 MATERIALS

209-2.1 Crushed aggregate base. Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, gravel, that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 98% with at least one fractured face ¹	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles ²	ASTM D4791
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

- ² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances ¹ (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 ² (425 µm)	10-30		±5
No. 200 ² (75 µm)	0-10		±3

¹ The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

² The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

209-2.3 Sampling and Testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the

requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. The Contractor shall take at least two aggregate base samples per day in the presence of the APM to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the APM.

209-2.4 Separation Geotextile. Not used.

26.3 CONSTRUCTION METHODS

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the APM, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The APM must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the APM. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the APM.

209-3.2 Preparing underlying subgrade and/or subbase. The underlying subgrade and/or subbase shall be checked and accepted by the APM before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the APM if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 Production. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 Placement. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the APM, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be

sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least **100%** of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within ± 2 percentage points of the optimum moisture content as determined by ASTM **D1557**. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 Weather limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompact to grade until the required smoothness and accuracy are obtained and approved by the APM. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

209-3.9 Acceptance sampling and testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yds.

Sampling locations will be determined on a random basis per ASTM D3665

a. Density. The Contractor's laboratory shall perform all density tests in the APM's presence and provide the test results upon completion to the APM for acceptance.

Each area shall be accepted for density when the field density is at least **100%** of the maximum density of laboratory specimens compacted and tested per ASTM 1557. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the APM for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at their expense, base material where depth tests have been taken.

The Contractor shall remove all survey and grade hubs from the base courses prior to constructing any asphalt pavements.

26.4 METHOD OF MEASUREMENT

209-4.1 The quantity of crushed aggregate base course will be determined by measurement of the number of cubic yards of material actually constructed and accepted by the APM as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

26.5 BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per cubic yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 45:	Crushed Aggregate Base Course, per cubic yard

26.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis American Association of State Highway and Transportation Officials (AASHTO)
M288	Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-209

27 ITEM P-306 LEAN CONCRETE BASE COURSE

27.1 DESCRIPTION

306-1.1 This item shall consist of a lean concrete subbase material that is composed of aggregate and cement uniformly blended together and mixed with water. The mixture may also include approved cementitious additives, in the form of fly ash or slag, and chemical admixtures. The mixed material shall be spread, shaped, and consolidated using concrete paving equipment in accordance with these specifications and in conformity to the lines, grades, dimensions, and typical cross-sections shown on the plans.

27.2 MATERIALS

306-2.1 Aggregate. The coarse aggregate fraction shall be crushed stone, crushed or uncrushed gravel, crushed and adequately seasoned, air-cooled, iron blast furnace slag, crushed recycled concrete, or a combination thereof. The fine aggregate fraction may be part of the natural aggregate blend as obtained from the borrow source or it may be natural sand that is added at the time of mixing. The aggregate shall meet the gradation and material requirements in the tables below.

Aggregate Material Requirements:

Material Test	Requirement	Standard
Coarse Aggregate Portion (retained on the No. 4 (4.75 mm) sieve)		
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Flat Particles, Elongated Particles, or Flat and Elongated Particles ¹	10% maximum, by weight, for fraction retained on the ½ inch (12.5mm) sieve and 10% maximum, by weight, for the fraction passing the 1/2-inch (12.5 mm) sieve	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate Portion (passing the No. 40 (425µm) sieve)		
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88

¹ A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

Aggregate Gradation for Lean Concrete:

Sieve Size (square openings)	Percentage by Weight Passing Sieves
	Gradation A
1-1/2 inch (37.5 mm)	100
1 inch (25.0 mm)	70 - 95
3/4 inch (19.0 mm)	55 - 85
No. 4 (4.75 mm)	30 - 60
No. 40 (425 µm)	10 - 30
No. 200 (75 µm)	0 - 15

306-2.2 Sampling and testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base stockpile in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraphs 306-2.1 and 306-2.2. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

306-2.3 Cement. Cement shall conform to the requirements of ASTM C150 Type II or other Type depending on the site conditions as evaluated by the APM.

Portland Cement conforming to requirements of ASTM C150-Type III (depending on the site conditions as evaluated by the APM) may be used when High Early Strength cement concrete of the required strength is required for opening the area for traffic per construction phasing schedules.

306-2.4 Cementitious additives. Pozzolanic and slag cement may be added to the lean concrete mix. If used, each material must meet the following requirements:

a. Pozzolan. Pozzolanic materials must meet the requirements of ASTM C618, Class F, or N with the exception of loss of ignition, where the maximum shall be less than 6%.

b. Slag cement (ground granulated blast furnace (GGBF) slag). Slag shall conform to ASTM C989, Grade 100 or 120.

306-2.5 Chemical admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all the requirements listed below. In addition, the APM may require the Contractor to submit complete test data showing that the material to be furnished meets all the requirements of the cited specification.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260.

b. Water-reducing admixtures. Water-reducing, set-controlling admixtures shall meet the requirements of ASTM C494, Type A, D, E, F, or G. Water-reducing admixtures shall be added at the mixer separately from air-entraining admixtures in accordance with the manufacturer's printed instructions. The air entrainment agent and the water-reducing admixture shall be compatible.

c. Retarding admixtures. Retarding admixtures shall meet the requirements of ASTM C494, Type B

or D.

d. Accelerating admixtures. Accelerating admixtures shall meet the requirements of ASTM C494, Type C.

306-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

306-2.7 Curing materials. For curing lean concrete, use white-pigmented, liquid membrane-forming compound conforming to ASTM C309, Type 2, Class B, or clear or translucent Type 1-D, Class B with white fugitive dye.

306-2.8 Bond Breaker. Unless otherwise indicated on the plans, bond breaker shall be one of the following:

- a. Choke stone shall be an ASTM C33 Number 89 stone placed in a 1/8-inch to 1/4-inch layer.
- b. Liquid membrane forming compound shall be in accordance with paragraph 306-2.7.

27.3 COMPOSITION OF MIXTURE

306-3.1 Mix design. The lean concrete mix design shall be based on trial batch results conducted in the laboratory. The lean concrete shall be designed to meet the criteria in this section.

Compressive strength shall not be less than 500 pounds per square inch (3,445 kPa) nor greater than 800 pounds per square inch (5,516 kPa) at seven (7) days. Compressive strengths shall be taken as the average of two compressive strength test results. All compressive strength specimens shall be prepared and tested in accordance with ASTM C192 and ASTM C39, respectively.

The percentage of air entrainment shall be 6%, $\pm 1/2\%$. Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag and other highly porous coarse aggregate.

If there is a change in aggregate sources, type of cement used, or pozzolanic materials, a new mix design must be submitted.

306-3.2 Submittals. At least 30 days prior to the placement of the lean concrete, the Contractor shall submit certified test reports to the APM for those materials proposed for use during construction, as well as the mix design information for the lean concrete material. The certification shall identify the specifications and test standard, the name of the testing laboratory, the date of the tests, and a statement that the materials comply with the applicable specifications. Tests older than six (6) months shall not be used. The submittal package shall include the following:

- a. Sources of materials, including aggregate, cement, admixtures, and curing and bond breaking materials.
- b. Physical properties of the aggregates, cement, admixtures, curing and bond breaking materials.
- c. Mix design:
 - Mix identification number
 - Weight of saturated surface-dry aggregates (fine and coarse)
 - Combined aggregate gradation
 - Cement factor

- Water content
- Water-cementitious material ratio (by weight)
- Volume of admixtures and yield for one cubic yard of lean concrete

d. Laboratory test results:

- Slump
- Unit weight
- Compressive strength at 3, 7, and 28 days (average values)

Where applicable, the Contractor shall submit a jointing plan for transverse joints in the lean concrete layer for approval by the APM.

During production, the Contractor shall submit batch tickets for each delivered load.

27.4 EQUIPMENT

306-4.1 All equipment necessary to mix, transport, place, compact, and finish the lean concrete material shall be furnished by the Contractor and is subject to inspection and approval by the APM. The Contractor shall provide certification that all equipment conforms to the requirements of ASTM C94.

306-4.2 Forms. Straight side forms shall be made of steel and shall be furnished in sections not less than 10 feet (3 m) in length. Forms shall have a depth equal to the pavement thickness at the edge. Flexible or curved forms of proper radius shall be used for curves of 100 feet (30 m) radius or less. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the APM. The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when accepted by the APM.

306-4.3 Concrete pavers. A fixed form or slip-form concrete paver may be used to place lean concrete. The paver shall be fully energized, self-propelled and capable of spreading, consolidating, and finishing the lean concrete material, true to grade, tolerances, and cross-sections. The paver shall be of sufficient weight and power to construct the maximum specified concrete paving lane width, at adequate forward speed, without transverse, longitudinal or vertical instability or without displacement. Slip-form pavers shall be equipped with electronic or hydraulic horizontal and vertical control devices. Bridge deck pavers are approved as paver-finishing machines for lean concrete, provided they are capable of handling the amount of lean concrete required for the full-lane width specified, and capable of spreading, consolidating, and finishing the lean concrete material, true to grade, tolerances, and cross-sections.

306-4.4 Vibrators. For fixed-form construction, vibrators may be either the surface pan type or internal type with either immersed tube or multiple spuds for the full width of the slab. They may be attached to the spreader, the finishing machine, or mounted on a separate carriage. They shall not come in contact with the subgrade or forms.

For slip-form construction, the paver shall be accomplished by internal vibrators for the full width and depth of the pavement being placed. The number, spacing, frequency, and eccentric weights of vibrators shall be provided to achieve acceptable consolidation without segregation and finishing quality. Internal vibrators may be supplemented by vibrating screeds operating on the surface of the lean concrete.

Vibrators and screeds shall automatically stop operation when forward motion ceases. An override switch shall be provided.

Handheld vibrators may be used in irregular areas.

306-4.5 Joint saws. The Contractor shall provide a sufficient number of saws with adequate power to cut contraction or construction joints to the required dimensions as shown on the plans. The Contractor shall provide at least one standby saw in good working order.

27.5 CONSTRUCTION METHODS

306-5.1 Control Strip. A control strip is not required on jobs less than 3,000 square yards. The following shall apply to the project using 3,000 square yards of lean concrete base or more. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the APM, that the materials, equipment, and construction processes meet the requirements of the specification. Control strips that do not meet specification requirements shall be removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the APM. Upon acceptance of the control strip by the APM, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the APM.

306-5.2 Weather limitations. The Contractor shall follow the recommended practices in American Concrete Institute (ACI) 306R, Guide to Cold Weather Concreting. The temperature of the mixed lean concrete shall not be less than 50°F (10°C) at the time of placement. The lean concrete shall not be placed when the ambient temperature is below 40°F (4°C) or when conditions indicate that the temperature may fall below 35°F (2°C) within 24 hours. The lean concrete shall not be placed on frozen underlying courses.

The Contractor shall follow the recommended practices in ACI 305R, Guide to Hot Weather Concreting. The lean concrete temperature from initial mixing through final cure shall not exceed 90°F (32°C). When the maximum daily air temperature exceeds 85°F (30°C), the forms and/or the underlying material shall be sprinkled with water before placing the lean concrete.

The Contractor should stop operations prior to and during rain allowing time to cover and protect any plastic lean concrete. Areas damaged by rain shall be refinished or replaced at the Contractor's expense.

306-5.3 Maintenance. The Contractor shall protect the lean concrete from environmental or mechanical damage. Traffic shall not be allowed on the pavement until test specimens made per ASTM C31 have attained a compressive strength of 500 psi (3445 kPa) when tested per ASTM C39. The Contractor shall maintain continuity of the applied curing method for the entire curing period.

306-5.4 Form setting. Form sections shall be tightly locked and shall be free from play or movement in any direction. The forms shall not deviate from true line by more than 1/4 inch (6 mm) at any joint. The top face of the form shall not vary from a true plane more than 1/8 inch (3 mm) in 10 feet (3 m), and the upstanding leg shall not vary more than 1/4 inch (6 mm). Forms shall be cleaned and oiled prior to the placing of lean concrete.

306-5.5 Preparation of underlying course. The underlying course shall be checked and accepted by the APM before placing operations begin. Prior to placing the material, the final grade should be firm, moist and free of frost. Use of chemicals to eliminate frost will not be permitted. The underlying course shall be wetted in advance of placing the lean concrete base course.

306-5.6 Grade control. Grade control shall be as necessary to construct the layer to the profile and cross-sections as shown on the plans.

306-5.7 Mixing. The batch plant site, layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work. Stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials.

All lean concrete shall be mixed and delivered to the site per the requirements of ASTM C94. The mixing time should be adequate to produce lean concrete that is uniform in appearance, with all ingredients evenly distributed. Mixing time shall be measured from the time all materials are emptied into the drum (provided all the water is added before one-fourth the preset mixing time has elapsed) and continues until the time the discharge chute is opened to deliver the lean concrete.

If mixing in a batch plant, the mixing time shall not be less than 50 or greater than 90 seconds. If mixing in a truck mixer, the mixing time shall not be less than 70 or more than 125 truck-drum revolutions at a mixing speed of not less than six (6) or more than 18 truck-drum revolutions per minute.

The elapsed time from the addition of cementitious material to the mix until the lean concrete is deposited in place at the work site shall not exceed 45 minutes when the concrete is hauled in non-agitating trucks, or 90 minutes when it is hauled in truck mixers or truck agitators.

Re-tempering lean concrete will not be permitted, except when delivered in truck mixers. With truck mixers, additional water may be added to the batch materials if the addition of water is added within 45 minutes after the initial mixing operations and the water/cement ratio specified in the mix design is not exceeded.

306-5.8 Placing. The lean concrete material shall be placed continuously at a uniform rate on the underlying course minimizing segregation and handling of the mix. Rakes shall not be allowed for spreading the lean concrete.

306-5.9 Finishing. Shape the finished surface of the lean concrete base layer to the specified lines, grades, and cross-section. Hand finishing will not be permitted except in areas where the mechanical finisher cannot operate.

The surface of the lean concrete shall not be textured under the Portland cement concrete pavement.

The surface of the lean concrete shall have a coarse texture if an asphalt pavement overlay is required to be placed on top of lean concrete base.

306-5.10 Construction limitations. All placement and finishing operations shall be completed within two (2) hours from the start of mixing. Material not completed within the 2-hour time limit shall be removed and replaced at the Contractor's expense.

At the end of each day's construction and/or when operations are interrupted for more than 30 minutes, a straight transverse construction joint shall be formed by a header or by cutting back into the compacted material to form a true vertical face.

Completed portions may be opened to light traffic when it has achieved its 7-day strength and the curing is not damaged.

306-5.11 Joints. Locate all longitudinal and transverse construction joints as shown on the plans. Longitudinal joints shall be within 6 inches (150 mm) of planned joints in the overlaying concrete pavement and transverse joints shall be within 3 inches (75 mm) the planned joints of the overlying concrete surface. Joints shall be sawn as soon as the base can support the saws without damage to the lean concrete base. Joints shall be constructed by sawing the hardened lean concrete to a depth of at least one-third the thickness of the lean concrete base, or 1/5th the depth of the lean concrete base when constructed using early entry saws.

306-5.12 Curing. Immediately after the finishing operations are complete and within two (2) hours of placement of the lean concrete, the entire surface and edges of the newly placed lean concrete shall be sprayed uniformly with white pigmented, liquid membrane forming curing compound conforming to ASTM C309, Type 2, Class B or clear or translucent Type 1-D, Class B with white fugitive dye in accordance with paragraph 306-2.7. The

layer should be kept moist using a moisture-retaining cover or a light application of water until the curing material is applied. The curing compound shall not be applied during rainfall.

The curing material shall be applied at a maximum coverage of 200 square feet per gallon (5.0 m²/l) using pressurized mechanical sprayers. The spraying equipment shall be a fully atomizing type equipped with a tank agitator. At the time of use, the curing compound in the tank shall be thoroughly and uniformly mixed with the pigment. During application, the curing compound shall be continuously stirred by mechanical means. Edges of the lean concrete layer shall be sprayed with curing compound immediately following placement with slip-form pavers or when side-forms are removed. Hand spraying of odd widths or shapes and lean concrete surfaces exposed by the removal of forms is permitted.

The lean concrete temperature during curing shall be in accordance with paragraph 306-5.2.

If the curing material becomes damaged from any cause, including sawing operations, within the required 7-day curing period or until the overlying course is constructed, the Contractor shall immediately repair the damaged areas by application of additional curing compound or other means approved by the APM.

306-5.13 Surface tolerance. The Contractor shall perform smoothness and grade checks daily. Any area not meeting smoothness and grade shall be corrected by the Contractor at the Contractor's expense. The Contractor shall provide smoothness and grade data to the APM on a daily basis.

a. Smoothness. The finished surface shall not vary more than $\pm 3/8$ -inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline, and, moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot grid. The Contractor shall correct any high spots more than $3/8$ inch (9 mm) in 12-foot (3.7-m) with a grinding machine or remove and replace the material at the Contractor's expense. Any areas that have been ground shall have curing compound reapplied.

b. Grade. The grade shall be measured on a 50-foot grid and shall be within ± 0.05 feet (15 mm) of the specified grade. When the surface is more than $1/2$ inch (12 mm) above the grade shown in the plans, the surface shall be corrected at the Contractor's expense to an elevation that falls within a tolerance of $1/4$ inch (6 mm).

306-5.14 Bond-breaker. Unless otherwise indicated on the plans, bond breaker shall be one of the following:

- a.** Choke stone per paragraph 306-2.8 shall be placed on the surface of the lean concrete to prevent bonding. The choke stone shall be placed in a layer approximately $1/4$ -inch (6 mm) thick. Liquid membrane forming compound per paragraph 306-2.8 shall be placed on the surface of the lean concrete to prevent bonding.
- b.** The liquid membrane forming compound when used as a bond breaker shall be applied at least eight (8) hours and not more than 24 hours before placement of the concrete pavement. The curing material shall be applied at a maximum coverage rate of 200 square feet per gallon (5.0 m²/l) using pressurized mechanical sprayers.

27.6 MATERIAL ACCEPTANCE

306-6.1 Sampling and testing. Acceptance sampling and testing to determine conformance with the requirements specified in this section will be performed by the APM for each 1200 square yards. Sampling locations will be determined by the APM on a random basis per ASTM D3665.

a. Compressive Strength. One sample of freshly delivered lean concrete will be taken for compressive strength for each 1200 square yards in accordance with ASTM C172 and air content tests in accordance with ASTM C231. Two test cylinders will be made and cured from the sample per ASTM C31 and the 7-day compressive strength of each cylinder determined per ASTM C39. The compressive strength will be computed by averaging the two 7-day compressive strengths.

The Contractor shall provide for the initial curing of cylinders in accordance with ASTM C31 during the 24 hours after molding.

b. Thickness. Cores shall be drilled by the Contractor at two different sampling locations for thickness determination for each 1200 square yards. Thickness will be determined by measuring the depth of core holes and computed by averaging the thickness determination of the two locations.

Core holes shall be filled by the Contractor with lean concrete base or non-shrink grout.

306-6.2 Acceptance.

a. Strength. If the lean concrete fails to meet the minimum compressive strength requirements, the Contractor shall remove and replaced the material at the Contractor's expense.

b. Thickness. If the average thickness is not deficient by more than 1/2 inch (12 mm) from the plan thickness, full payment shall be made. When such measurement is deficient by more than 1/2 inch (12 mm) but less than one inch (25 mm) from the plan thickness, the area represented by the test shall be removed and replaced at the Contractor's expense or shall be permitted to remain in-place at an adjusted payment of 75% of the contract unit price.

27.7 METHOD OF MEASUREMENT

306-7.1 The quantity of lean concrete base course will be determined by the number of cubic yards of lean concrete actually constructed and accepted by the APM as complying with the plans and specifications.

27.8 BASIS OF PAYMENT

306-8.1 The accepted quantities of lean concrete will be paid for at the contract unit price per cubic yard for lean concrete base. The price and payment shall be full compensation for furnishing and placing all materials, provided; however, for any pavement found deficient in thickness as specified in paragraph 306- 6.2b, the reduced unit price shall be paid.

Payment will be made under:

Item 46:	Lean Concrete Base Course, per cubic yard.

27.9 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates

ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Specification for Coal Fly Ash and Raw and Calcined Natural Pozzolans for Use in Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregates (Accelerated Mortar-Bar Method)
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete American Association of State Highway and Transportation Officials (AASHTO)
AASHTO T136	Standard Method of Test for Freezing-and-Thawing Tests of Compacted Soil-Cement Mixtures
ASTM D3665	Standard Practice for Random Sampling of Construction Materials American Concrete institute (ACI)
ACI 305R	Guide to Hot Weather Concreting

ACI 306R

Guide to Cold Weather Concreting

END OF ITEM P-306

28 ITEM P-401 ASPHALT MIX PAVEMENT

28.1 DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

401-1.2 Submittals. Prior to beginning work in this section, the Contractor shall submit the following but is not limited to:

- a. Asphalt concrete job mix formula with Engineer's stamp and required test reports.
- b. Test reports and certificates of compliance for aggregates and asphalt binder.
- c. Quality control plan for asphalt concrete paving to include all testing procedures and frequency in accordance with the requirements of Item P-401.
- d. Laydown (Paving) plan in accordance with Paragraph 4.12.
- e. Asphalt concrete field test results.
- f. Job Mix Formula laboratory accreditation and certification per Paragraph 3.2.
- g. Testing laboratory accreditation and certification.
- h. Core hole fill material and procedures.

28.2 MATERIALS

401-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0 % maximum	ASTM C142
Percentage of Fractured Particles	Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face ¹	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 ²	ASTM D4791
Bulk density of slag ³	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

³ Only required if slag is specified.

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements:

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate.

401-2.2 Mineral filler. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral Filler Requirements:

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

401-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) **76-22 PM** unless otherwise approved by the APM.

Asphalt Binder PG Plus Test Requirements

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084 ¹

¹ Follow procedure B on RTFO aged binder.

401-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

28.3 COMPOSITION

401-3.1 Composition of mixture(s). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 Job mix formula (JMF) laboratory. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the APM prior to start of construction.

401-3.3 Job mix formula (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the APM for review and accepted in writing. The APM's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the APM for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the APM and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the APM, will be borne by the Contractor.

The APM may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.
- Specific Gravity and absorption of each coarse and fine aggregate.

- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows or gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR) ¹	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) ^{2,3}	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

¹ Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze- thaw conditioning in lieu of moisture conditioning per ASTM D4867.

² AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

³ Where APA not available , use Hamburg Wheel test (AASHTO T-324) 10mm @ 20,000 passes at 50°C.

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve (Gradation 2)
1 inch (25.0 mm)	--
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 µm)	18-38
No. 50 (300 µm)	11-27
No. 100 (150 µm)	6-18
No. 200 (75 µm)	3-6
Minimum Voids in Mineral Aggregate (VMA)¹	15.0

Sieve Size	Percentage by Weight Passing Sieve (Gradation 2)
Asphalt Percent:	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
Recommended Minimum Construction Lift Thickness	2 inches

¹To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.4 Reclaimed asphalt pavement (RAP). RAP shall not be used.

401-3.5 Control Strip. A control strip is required where the project includes a minimum 3,000 tons of Asphalt mix or as required by the APM.

Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the APM. The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 401-5.1, has been accepted, in writing, by the APM.

The control strip will consist of at least 250 tons or 1/2 subplot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 401-4.14 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip will be considered acceptable by the APM if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 401-5.5a; and Mat density greater than or equal to 94.5%, air voids 3.5% +/- 1%, and joint density greater than or equal to 92.5%.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

The control strip will be considered one lot for payment based upon the average of a minimum of 3 samples (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 401-8.1 using a lot pay factor equal to 100.

28.4 CONSTRUCTION METHODS

401-4.1 Weather limitations. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the APM, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40 ¹	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

401-4.2 Asphalt plant. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

a. Inspection of plant. The APM, or APM's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

b. Storage bins and surge bins. The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the APM determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

401-4.3 Aggregate stockpile management. Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

401-4.4 Hauling equipment. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the APM. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4.1 Material transfer vehicle (MTV). Material transfer vehicles used to transfer the material from the hauling equipment to the paver, shall use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation.

401-4.5 Asphalt pavers. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade.

The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

401-4.6 Rollers. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

401-4.7 Density device. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the APM upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.8 Preparation of asphalt binder. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

401-4.9 Preparation of mineral aggregate. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.10 Preparation of Asphalt mixture. The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

401-4.11 Application of Prime and Tack Coat. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt mixture where it is specified in the plans.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

401-4.12 Laydown plan, transporting, placing, and finishing. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the APM.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to APM that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the APM. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of **10** feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The APM may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the APM, and if it can be demonstrated in the laboratory, in the presence of the APM, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the APM, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

401-4.13 Compaction of asphalt mixture. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.14 Joints. The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project at no cost to the owner. Asphalt tack coat in accordance with FAA Item P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

401-4.15 Saw-cut grooving. Saw-cut grooves, where specified in the plans shall be provided as specified in FAA Item P-621.

401-4.16 Diamond grinding. Diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the APM that the grinding equipment will produce satisfactory results prior to making corrections to surfaces. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 or an approved surface treatment as directed by APM to all areas that have been subject to grinding.

401-4.17 Nighttime paving requirements. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the APM prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

28.5 CONTRACTOR QUALITY CONTROL (CQC)

401-5.1 General. The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

401-5.2 Contractor quality control (QC) facilities. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The APM shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The APM will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-5.3 Contractor QC testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

a. Asphalt content. A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

b. Gradation. Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

c. Moisture content of aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

f. In-place density monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than 1/4 inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the APM. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using either the FAA profile program, ProFAA, or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet (15

m) or more often as determined by the APM. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate grade-lines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the grade-line elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically. The documentation will be provided by the Contractor to the APM by the end of the following working day.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus 1/2 inch and replacing with new material. Skin patching is not allowed.

401-5.4 Sampling. When directed by the APM, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-5.5 Control charts. The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the APM and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the

Contractor is not taking satisfactory corrective action, the APM may suspend production or acceptance of the material.

a. Individual measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements:

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts shall be established to control gradation process variability. The range shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of $n = 2$. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for $n = 3$ and by 1.27 for $n = 4$.

Control Chart Limits Based on Range:

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 µm)	6%
No. 200 (75 µm)	3.5%
Asphalt Content	0.8%

c. Corrective Action. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

- (1) One point falls outside the Suspension Limit line for individual measurements or range; or
- (2) Two points in a row fall outside the Action Limit line for individual measurements.

401-5.6 QC reports. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

28.6 MATERIAL ACCEPTANCE

401-6.1 Acceptance sampling and testing. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the APM at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

a. Quality assurance (QA) testing laboratory. The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

b. Lot size. A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

For small projects, with multiple small placements or if the total project size is less than 3,000 tons, acceptable material will be paid for by the ton placed per day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

c. Asphalt air voids. Plant-produced asphalt will be tested for air voids on a subplot basis.

(1) Sampling. Material from each subplot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each subplot in accordance with ASTM D3203 for a set of three compacted specimens prepared in accordance with ASTM D6926.

d. In-place asphalt mat and joint density. Each subplot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

(1) Sampling. The Contractor will cut minimum 5 inches (125 mm) diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the APM.

(2) Bond. Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the APM to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the APM.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the APM for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each subplot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or subplot shall be corrected by the Contractor at their expense by removing the deficient area and replacing with new pavement. The Contractor, at their expense, may take additional cores as approved by the APM to circumscribe the deficient area.

(4) Mat density. One core shall be taken from each subplot. Core locations will be determined by the APM in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each subplot sample by the TMD for that subplot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each subplot that has a longitudinal joint. Core locations will be determined by the APM in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 Acceptance criteria.

a. General. Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, grade and Profilograph roughness only for runway and/or taxiway pavement projects greater than 500 feet in length.

b. Air Voids and Mat density. Acceptance of each lot of plant produced material for mat density and

air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

c. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

d. Grade. The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing, at all longitudinal grade breaks, and at start and end of each lane placed. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline, edge of runway and/or taxiway pavement, and edge of paved shoulders.

The survey and documentation shall be stamped and signed by a licensed surveyor including providing CAD files. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

e. Profilograph roughness for QA Acceptance. Profilograph roughness shall be used only for runway and/or taxiway pavement projects greater than 500 feet in length.

The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the APM shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hrs of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate “must grind” bumps and the Profile Index for the pavement using a 0.2-inch (5 mm) blanking band. The bump template must span one inch (25 mm) with an offset of 0.4 inches (10 mm). The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch (25 mm) equals 25 feet (7.5 m) and a vertical scale of one inch (25 mm) equals one inch (25 mm). Profilograph shall be performed one foot right and left of project centerline and 15 feet (4.5 m) right and left of project centerline. Any areas that indicate “must grind” shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing full depth of surface course. as directed by the APM. Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10 mile or less.

401-6.3 Percentage of material within specification limits (PWL). The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

Table 5. Acceptance Limits for Air Voids and Density:

Test Property	Pavements Specification

	Tolerance Limits	
	L	U
Air Voids Total Mix (%)	2.0	5.0
Surface Course Mat Density (%)	92.8	-
Base Course Mat Density (%)	92.0	-
Joint density (%)	90.5	--

a. Outliers. All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

401-6.4 Resampling pavement for mat density.

a. General. Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the APM. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-

6.2b. Only one resampling per lot will be permitted.

(1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%.

401-6.5 Leveling course. Not used.

28.7 METHOD OF MEASUREMENT

401-7.1 Measurement. Asphalt shall be measured by the number of tons of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage. Grinding of asphalt

pavement shall be measured by the number of square yards of grinding as specified in-place, completed, and accepted by APM.

28.8 BASIS OF PAYMENT

401-8.1 Payment. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

a. The total project payment for plant mix asphalt pavement shall not exceed **100** percent of the product of the contract unit price and the total number of tons (kg) of asphalt used in the accepted work.

b. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

c. Basis of adjusted payment. The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the sublot shall be reduced by 5%.

Table 6. Price adjustment schedule¹

Percentage of material within specification limits (PWL)	Lot pay factor (percent of contract unit price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject ²

¹ Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.

² The lot shall be removed and replaced. However, the APM may decide to allow the rejected lot to remain. In that case, if the APM and Contractor agree in writing that the lot shall not be removed, it

shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

d. Profilograph Roughness. Profilograph roughness shall be used Only for runway and/or taxiway pavement projects greater than 500 feet in length.

The Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 401-6.2e. When the final average profile index for the entire length of pavement does not exceed 15 inches per mile per 1/10 mile, payment will be made at the contract unit price for the completed pavement.

401-8.1 Payment.

Payment will be made under:

Item 47:	Asphalt Surface Course (Up to 50 Tons), per ton
Item 48:	Asphalt Surface Course (51 to 200 Tons), per ton
Item 49:	Asphalt Surface Course (201 to 2,000 Tons), per ton
Item 50:	Asphalt Pavement Grinding, per square yard

28.9 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates

ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing

ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Duclilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
ASTM E2133	Standard Test Method for Using a Rolling Inclinator to Measure Longitudinal and Transverse Profiles of a Traveled Surface American Association of State Highway and Transportation Officials (AASHTO)
AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder
Asphalt Institute MS-2 Mix Design Manual, 7th Edition
AI State Binder Specification Database

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder Program

Advisory Circulars (AC)

AC 150/5320-6 Airport Pavement Design and Evaluation

FAA Orders

5300.1 Modifications to Agency Airport Design, Construction, and Equipment
Standards

Software FAARFIELD

END OF ITEM P-401

29 ITEM P-403 ASPHALT MIX PAVEMENT BASE, LEVELING AND SURFACE COURSE

29.1 DESCRIPTION

403-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

403-1.2 Submittals. Prior to beginning work in this section, the Contractor shall submit the following but is not limited to:

- a. Asphalt concrete job mix formula with Engineer's stamp and required test reports.
- b. Test reports and certificates of compliance for aggregates and asphalt binder.
- c. Quality control plan for asphalt concrete paving to include all testing procedures and frequency in accordance with the requirements of Item P-403.
- d. Laydown (Paving) plan in accordance with Paragraph 4.11.
- e. Asphalt concrete field test results.
- f. Job Mix Formula laboratory accreditation and certification per Paragraph 3.2.
- g. Testing laboratory accreditation and certification.
- h. Core hole fill material and procedures.

29.2 MATERIALS

403-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

- a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum for surface, asphalt binder, and leveling course Loss: 50% maximum for base course	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0 % maximum	ASTM C142
Percentage of Fractured Particles	Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face ¹	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles with a value of 5:1 ²	ASTM D4791
Bulk density of slag ³	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

³ Only required if slag is specified.

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0 % maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0 to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate, and ASTM C183 shall be used in sampling mineral filler.

403-2.2 Mineral filler. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

403-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) **70-10**.

Asphalt Binder PG Plus Test Requirements*

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084 ¹

¹ Follow procedure B on RTFO aged binder.

*If the PG spread is less than 92, delete the Asphalt Binder PG Plus Test Requirements table.

403-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

403-2.5 Bond Breaker. Not used

29.3 COMPOSITION

403-3.1 Composition of mixture. The asphalt plant mix shall be composed of a mixture of well-graded aggregate, filler and anti-strip agent if required, and asphalt binder. The several aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

403-3.2 Job mix formula (JMF) laboratory. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF, and listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the APM prior to start of construction.

403-3.3 Job mix formula (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the APM for review and accepted in writing. The APM's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 403-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the APM for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the APM and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the APM, will be borne by the Contractor. The APM may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The submitted JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 403-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 403-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 403-2.1 and 403-2.2.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the

JMF.

- Specific Gravity and absorption of each course and fine aggregate.
- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations.
- Laboratory mixing and compaction temperatures.
- Supplier recommended mixing and compaction temperatures.
- Plot of the combined gradation on the 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows/gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
TSR ¹	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) ^{2,3}	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

¹ Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze- thaw conditioning in lieu of moisture conditioning per ASTM D4867.

² AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

³ Where APA not available, use Hamburg wheel test (AASHTO T 324) 10 mm@ 20,000 passes at 50°C.

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply, be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve (Gradation 2)	Percentage by Weight Passing Sieve (Gradation 3) To be used for leveling course only
1 inch (25.0 mm)	--	--
3/4 inch (19.0 mm)	100	--
1/2 inch (12.5 mm)	90-100	--
3/8 inch (9.5 mm)	72-88	90-100
No. 4 (4.75 mm)	53-73	58-78
No. 8 (2.36 mm)	38-60	40-60
No. 16 (1.18 mm)	26-48	28-48
No. 30 (600 µm)	18-38	18-38
No. 50 (300 µm)	11-27	11-27
No. 100 (150 µm)	6-18	6-18
No. 200 (75 µm)	3-6	3-6
Voids in Mineral Aggregate (VMA)¹	15	16
Asphalt Percent:		
Stone or gravel	5.0-7.5	5.5-8.0
Slag	6.5-9.5	7.0-10.5
Recommended Minimum Construction Lift Thickness	2 inches	1 1/2 inch

¹To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

403-3.4 Reclaimed Asphalt Pavement (RAP). RAP shall not be used.

403-3.5 Control strip. A control strip is required where the project includes a minimum 3,000 tons of Asphalt mix.

Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the APM. The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 403-5.1, has been accepted, in writing, by the APM.

The control strip will consist of at least 250 tons or 1/2 subplot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 403-4.13 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip shall be evaluated for acceptance as a single lot in accordance with the acceptance criteria in paragraph 403-6.1 and 403-6.2.

The control strip will be considered acceptable by the APM if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 403-5.5a; and Mat density greater than or equal to 94%, air voids 3.5% +/- 1%, and joint density greater than or equal to 92%.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

The control strip will be considered one lot for payment based upon the average of a minimum of 3 samples (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 403-8.1.

29.4 CONSTRUCTION METHODS

403-4.1 Weather limitations. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the APM, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	Degrees F	Degrees C
3 inches (7.5 cm) or greater	40	4

Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

403-4.2 Asphalt plant. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items:

a. Inspection of plant. The APM, or APM's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

b. Storage bins and surge bins. The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the APM determines there is an excessive heat loss, segregation or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

403-4.3 Aggregate stockpile management. Aggregate stockpiles shall be constructed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

403-4.4 Hauling equipment. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the APM. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

403-4.4.1 Material transfer vehicle (MTV). Material transfer Vehicles shall be required due to the improvement in smoothness and decrease in both physical and thermal segregation. To transfer the material from the hauling equipment to the paver, use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without contacting the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation.

403-4.5 Asphalt pavers. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.11.

403-4.6 Rollers. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

403-4.6.1 Density device. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall also supply a qualified technician during all paving operations to calibrate the density gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the APM upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

403-4.7 Preparation of asphalt binder. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt material to the mixer at a uniform temperature. The temperature of the unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

403-4.8 Preparation of mineral aggregate. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

403-4.9 Preparation of asphalt mixture. The aggregates and the asphalt binder shall be weighed or metered and introduced into the mixer in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

403-4.10 Application of Prime and Tack Coat. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt mixture where it is specified in the plans.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

403-4.11 Laydown plan, transporting, placing, and finishing. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number

of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the APM.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to APM that every lot of each lift meets the grade tolerances of paragraph 401-6.2e before the next lift can be placed. Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the APM. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of **10** feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 1 foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The APM may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the APM, and if it can be demonstrated in the laboratory, in the presence of the APM, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the APM, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

403-4.12 Compaction of asphalt mixture. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion

of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

403-4.13 Joints. The formation of all joints shall be made in such a manner as to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. An asphalt tack coat or other product approved by the APM shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

403-4.14 Saw-cut grooving. Saw-cut grooving is not required.

403-4.15 Diamond grinding. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a minimum of 55 to 60 blades per 12 inches (300 mm) of cutting head width; grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that causes ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted.

Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

403-4.16 Nighttime Paving Requirements. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the APM prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

29.5 CONTRACTOR QUALITY CONTROL (CQC)

403-5.1 General. The Contractor shall develop a CQCP in accordance with Item C-100. No partial payment will be made for materials that are subject to specific QC requirements without an approved CQCP.

403-5.2 Contractor quality control (QC) facilities. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The APM shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The APM will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

403-5.3 Quality Control (QC) testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP

a. Asphalt content. A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

b. Gradation. Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444 and ASTM C136, and ASTM C117.

c. Moisture content of aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content of the asphalt shall be determined once per lot in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per lot, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

f. In-place density monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than 1/4 inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the APM. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by

its length and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA, using the 12- foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement and between the start and stop of lanes place shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements will be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the APM. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests will be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 403-4.15 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3) Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to the placement of the first lift and then prior to and after placement of the surface lift.

Measurements will be taken at appropriate grade-lines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the grade-line elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically. The documentation will be provided by the Contractor to the APM by the end of the following working day.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 403-4.15.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus 1/2 inch and replacing with new material. Skin patching is not allowed.

403-5.4 Sampling. When directed by the APM, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

403-5.5 Control charts. The Contractor shall maintain linear control charts both for individual measurements and range (i.e., difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day shall be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the APM and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the APM may suspend production or acceptance of the material.

a. Individual measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the JMF target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts for range shall be established to control process variability for the test parameters and Suspension Limits listed below. The range shall be computed for each lot as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of $n = 2$. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for $n = 3$ and by 1.27 for $n = 4$.

Control Chart Limits Based on Range (n = 2)

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 µm)	6%
No. 200 (75 µm)	3.5%
Asphalt Content	0.8%

c. Corrective action. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain sets of rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

- (1) One point falls outside the Suspension Limit line for individual measurements or range; or
- (2) Two points in a row fall outside the Action Limit line for individual measurements.

403-5.6 Quality control (QC) reports. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with the CQCP described in Item C-100.

29.6 MATERIAL ACCEPTANCE

403-6.1. Quality Assurance Acceptance sampling and testing. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the APM at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

a. Quality Assurance (QA) testing laboratory. The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

b. Lot Size. A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

For small projects, with multiple small placements or if the total project size is less than 3,000 tons, acceptable material will be paid for by the ton placed per day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

c. Asphalt air voids. Plant-produced asphalt will be tested for air voids on a subplot basis.

(1) Sampling. Material from each subplot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each subplot in accordance with ASTM D3203 for a set of three compacted specimens prepared in accordance with ASTM D6926 **or** ASTM D6925.

d. In-place asphalt mat and joint density. Each subplot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

(1) Sampling. The Contractor will cut minimum 5 inches (125 mm) diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the APM.

(2) Bond. Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the APM to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the APM.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the APM for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each subplot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or subplot shall be corrected by the Contractor at their expense by removing the deficient area and replacing with new pavement. The Contractor, at their expense, may take additional cores as approved by the APM to circumscribe the deficient area.

(4) Mat density. One core shall be taken from each subplot. Core locations will be determined by the APM in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each subplot sample by the TMD for that subplot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each subplot which contains a longitudinal joint. Core locations will be determined by the APM in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

403-6.2 Acceptance criteria.

a. General. Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, and grade.

b. Air voids. Acceptance of each lot of plant produced material for air voids will be based upon the average air void from the sublots. If the average air voids of the lot are equal to or greater than 2% and equal to or less than 5%, then the lot will be acceptable. If the average is below 2% or greater than 5%, the lot shall be removed and replaced at the Contractor's expense.

c. Mat density. Acceptance of each lot of plant produced material for mat density will be based on the average of all of the densities taken from the sublots. If the average mat density of the lot so established equals or exceeds 94%, the lot will be acceptable. If the average mat density of the lot is below 94%, the lot shall be removed and replaced at the Contractor's expense.

d. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the average of all of the joint densities taken from the sublots. If the average joint density of the lot so established equals or exceeds 92%, the lot will be acceptable. If the average joint density of the lot is less than 92%, the Contractor shall stop production and evaluate the method of compacting joints. Production may resume once the reason for poor compaction has been determined and appropriate measures have been taken to ensure proper compaction.

e. Grade. The final finished surface of the pavement of the completed project shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline, edge of runway and/or taxiway pavement, edge of paved shoulders, and other pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

f. Profilograph roughness for QA Acceptance. Not used.

403-6.3 Resampling Pavement for Mat Density.

a. General. Resampling of a lot of pavement will only be allowed for mat density and then, only if the Contractor requests same in writing, within 48 hours after receiving the written test results from the APM. A retest will consist of all the sampling and testing procedures contained in paragraphs 403-6.1. Only one resampling per lot will be permitted.

(1) A redefined mat density will be calculated for the resampled lot. The number of tests used to calculate the redefined mat density will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined mat density for a resampled lot will be used to evaluate the acceptance of that lot in accordance with paragraph 403-6.2.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded and density determined using the remaining test values.

403-6.4 Leveling course. Leveling course shall be used only where it is specified on the plans or in the areas approved by APM. The leveling course is the first variable thickness lift placed to correct surface irregularities prior to placement of subsequent courses. The leveling course shall meet the aggregate gradation in Table 2, paragraph 403-3.3. The leveling course shall meet the requirements of paragraph 403- 3.3, 403-6.1b for air voids,

but shall not be subject to the density requirements of paragraph 403-6.1c. The leveling course shall be compacted with the same effort used to achieve density of the control strip. The leveling course shall not exceed the lift thickness associated with each gradation in Table 2, paragraph 403- 3.3.

29.7 METHOD OF MEASUREMENT

403-7.1 Measurement. Plant mix asphalt mix pavement shall be measured by the number of tons of asphalt pavement used in the accepted work. Recorded batch weights or truck scale weights will be used to determine the basis for the tonnage. Grinding of asphalt pavement shall be measured by the number of square yards of grinding as specified in-place, completed, and accepted by APM.

29.8 BASIS OF PAYMENT

403-8.1 Payment. Payment for a lot of asphalt mixture meeting all acceptance criteria as specified in paragraph 403-6.2 shall be made at the contract unit price per ton for asphalt. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 51:	Asphalt Mixture Base, Leveling and Surface Course (Up to 50 Tons), per ton
Item 52:	Asphalt Mixture Base, Leveling and Surface Course (51 to 200 Tons), per ton
Item 53:	Asphalt Mixture Base, Leveling and Surface Course (201 to 2,000 Tons), per ton

29.9 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates

ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C183	Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Bituminous Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
ASTM D1074	Standard Test Method for Compressive Strength of Bituminous Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

ASTM D4125	Standard Test Methods for Asphalt Content of Bituminous mixtures by the Nuclear Method
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5581	Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (6 inch-Diameter Specimen)
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6307	Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E2133	Standard Test Method for Using a Rolling Inclinator to Measure Longitudinal and Transverse Profiles of a Traveled Surface American Association of State Highway and Transportation Officials (AASHTO)
AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)
Asphalt Institute (AI)	
MS-2	Mix Design Manual, 7th Edition
MS-26	Asphalt Binder Handbook
	AI State Binder Specification Database
FAA Orders	
5300.1	Modifications to Agency Airport Design, Construction, and Equipment Standards
Federal Highway Administration (FHWA)	
Long Term Pavement Performance Binder program	
Software	
FAARFIELD	

END OF ITEM P-403

30 ITEM P-501 CEMENT CONCRETE PAVEMENT

30.1 DESCRIPTION

501-1.1 This work shall consist of pavement composed of cement concrete with reinforcement and without reinforcement constructed on a prepared underlying surface in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross-sections shown on the plans. The terms cement concrete, hydraulic cement concrete, and concrete are interchangeable in this specification.

502-1.2 Submittals. Prior to beginning work for this section, the Contractor shall submit the following but is not limited to:

- a. Concrete mix design with Engineer's stamp and required test reports.
- b. Test reports and certificates of compliance for aggregates, water, cement, and admixtures.
- c. Quality control plan for cement concrete pavement.
- d. Product data, manufacturer's specifications, and mill certificates for steel dowels.
- e. Product data, manufacturer's specifications, and certificate of compliance for steel dowel coating.
- f. Product data and manufacturer's specifications for epoxy resin.
- g. Product data and manufacturer's specifications for curing compound.
- h. Product data and manufacturer's specifications for compressible material for isolation joints.
- i. Testing laboratory accreditation and certification per Paragraph 6.2.

30.2 MATERIALS

501-2.1 Aggregates.

a. Reactivity. Fine and Coarse aggregates to be used in PCC on this project shall be tested and evaluated by the Contractor for alkali-aggregate reactivity in accordance with both ASTM C1260 and ASTM C1567. Tests must be representative of aggregate sources which will be providing material for production. ASTM C1260 and ASTM C1567 tests may be run concurrently.

(1) Coarse aggregate and fine aggregate shall be tested separately in accordance with ASTM C1260, however, the length of test shall be extended to 28 days (30 days from casting). Tests must have been completed within 6 months of the date of the concrete mix submittal.

(2) The combined coarse and fine aggregate shall be tested in accordance with ASTM C1567, modified for combined aggregates, using the proposed mixture design proportions of aggregates, cementitious materials, and/or specific reactivity reducing chemicals. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

(3) If lithium nitrate is proposed for use with or without supplementary cementitious materials, the aggregates shall be tested in accordance with Corps of Engineers (COE) Concrete Research Division (CRD) C662 in lieu of ASTM C1567. If lithium nitrate admixture is used, it shall be nominal 30% $\pm$ 0.5% weight lithium nitrate in water. If the expansion does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

b. Fine aggregate. Grading of the fine aggregate, as delivered to the mixer, shall conform to the requirements of ASTM C33 and the parameters identified in the fine aggregate material requirements below. Fine aggregate material requirements and deleterious limits are shown in the table below.

Fine Aggregate Material Requirements		
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Sand Equivalent	45minimum	ASTM D2419
Fineness Modulus (FM)	$2.50 \leq FM \leq 3.40$	ASTM C136
Limits for Deleterious Substances in Fine Aggregate for Concrete		
Clay lumps and friable particles	1.0% maximum	ASTM C142
Coal and lignite	0.5% using a medium with a density of Sp. Gr. of 2.0	ASTM C123
Total Deleterious Material	1.0% maximum	

c. Coarse aggregate. The maximum size coarse aggregate shall be **1-1/2-inch**.

Aggregates delivered to the mixer shall be clean, hard, uncoated aggregates consisting of crushed stone, crushed or uncrushed gravel, air-cooled iron blast furnace slag, crushed recycled concrete pavement, or a combination. The aggregates shall have no known history of detrimental pavement staining. Steel blast furnace slag shall not be permitted. Coarse aggregate material requirements and deleterious limits are shown in the table below; washing may be required to meet aggregate requirements.

Coarse Aggregate Material Requirements:

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 for any size group coarser than 3/8 (9.5 mm) sieve ¹	ASTM D4791
Bulk density of slag ²	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29
D-cracking(Freeze- Thaw) ³	Durability factor $\geq$ 95	ASTM C666

¹ A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

² Only required if slag is specified.

³ Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

The amount of deleterious material in the coarse aggregate shall not exceed the following limits:

Limits for Deleterious Substances in Coarse Aggregate

Deleterious material	ASTM	Percentage by Mass
Clay Lumps and friable particles	ASTM C142	1.0
Material finer than No. 200 sieve (75 µm)	ASTM C117	1.0 ¹
Lightweight particles	ASTM C123 using a medium with a density of Sp. Gr. of 2.0	0.5
Chert ² (less than 2.40 Sp Gr.)	ASTM C123 using a medium with a density of Sp. Gr. of 2.40)	1.0

¹ The limit for material finer than 75-µm is allowed to be increased to 1.5% for crushed aggregates consisting of dust of fracture that is essentially free from clay or shale. Test results supporting acceptance of increasing limit to 1.5% with statement indicating material is dust of fracture must be submitted with Concrete mix. Acceptable techniques to characterizing these fines include methylene blue adsorption or X-ray diffraction analysis.

² Chert and aggregates with less than 2.4 specific gravity.

d. Combined aggregate gradation. This specification is targeted for a combined aggregate gradation developed following the guidance presented in United States Air Force Engineering Technical Letter (ETL) 97-5: Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements. Base the aggregate grading upon a combination of all the aggregates (coarse and fine) to be used for the mixture proportioning. Three aggregate sizes may be required to achieve an optimized combined gradation that will produce a workable concrete mixture for its intended use. Use aggregate gradations that produce concrete mixtures with well-graded or optimized aggregate combinations. The Contractor shall submit complete mixture information necessary to calculate the volumetric components of the mixture. The combined aggregate grading shall meet the following requirements:

(1) The materials selected and the proportions used shall be such that when the Coarseness Factor (CF) and the Workability Factor (WF) are plotted on a diagram as described in paragraph 501-2.1d(4) below, the point thus determined shall fall within the parallelogram described therein.

(2) The CF shall be determined from the following equation:

$$CF = \frac{\text{(cumulative percent retained on the 3/8 in. (9.5 mm) sieve)}(100)}{\text{(cumulative percent retained on the No. 8 (2.36 mm) sieve)}}$$

(3) The WF is defined as the percent passing the No. 8 (2.36 mm) sieve based on the combined gradation. However, WF shall be adjusted, upwards only, by 2.5 percentage points for each 94 pounds (42 kg) of cementitious material per cubic meter yard greater than 564 pounds per cubic yard.

(4) A diagram shall be plotted using a rectangular scale with WF on the Y-axis with units from 20 (bottom) to 45 (top), and with CF on the X-axis with units from 80 (left side) to 30 (right side). On this

diagram a parallelogram shall be plotted with corners at the following coordinates (CF-75, WF-28), (CF-75, WF-40), (CF-45, WF-32.5), and (CF-45, WF-44.5). If the point determined by the intersection of the computed CF and WF does not fall within the above parallelogram, the grading of each size of aggregate used and the proportions selected shall be changed as necessary. The point determined by the plotting of the CF and WF may be adjusted during production ± 3 WF and ± 5 CF. Adjustments to gradation may not take the point outside of the parallelogram.

e. Contractors combined aggregate gradation. The Contractor shall submit their combined aggregate gradation using the following format:

Contractor's Combined Aggregate Gradation

Sieve Size	Contractor's Concrete mix Gradation (Percent passing by weight)
2 inch (50 mm)	*
1-1/2 inch (37.5 mm)	*
1 inch (25.0 mm)	*
3/4 inch (19.0 mm)	*
1/2 inch (12.5 mm)	*
3/8 inch (9.5 mm)	*
No. 4 (4.75 mm)	*
No. 8 (2.36 mm)	*
No. 16 (1.18 mm)	*
No. 30 (600 μ m)	*
No. 50 (300 μ m)	*
No. 100 (150 μ m)	*

501-2.2 Cement. Cement shall conform to the requirements of ASTM C150 - Type II or V

(depending on the site conditions as evaluated by the APM).

501-2.2.1 Cement for High Early Strength (HES) cement concrete. Portland Cement conforming to requirements of ASTM C150-Type III (depending on the site conditions as evaluated by the APM) may be used when High Early Strength cement concrete of the required strength is required for opening the area for traffic per construction phasing schedules or an equivalent acceptable product as approved by the APM.

501-2.3 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total alkali content less than 3% per ASTM C311. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance, or the material may be tested independently by the APM.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

c. Raw or calcined natural pozzolan. Natural pozzolan shall be raw or calcined and conform to ASTM C618, Class N, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 6%. Class N pozzolan for use in mitigating Alkali-Silica Reactivity shall have a total available alkali content less than 3%.

d. Ultrafine fly ash and ultrafine pozzolan. Not used.

501-2.4 Joint seal. The joint seal for the joints in the concrete pavement shall meet the requirements of Item P-604 or Item P-605 as specified on the plans and shall be of the type specified in the plans.

501-2.5 Isolation joint filler. Premolded joint filler for isolation joints shall conform to the requirements of ASTM D1751 or ASTM D1752 and shall be where shown on the plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint, unless otherwise specified by the APM. When the use of more than one piece is required for a joint, the abutting ends shall be fastened securely and held accurately to shape by stapling or other positive fastening means satisfactory to the APM.

501-2.6 Steel reinforcement. Reinforcing shall consist of deformed and plain carbon-steel bars for concrete reinforcement, or carbon-steel wire and welded wire reinforcement, plain and deformed, for concrete, conforming to the requirements of ASTM A615 and A1064 respectively. Welded wire fabric shall be furnished in flat sheets only.

501-2.7 Dowel and tie bars. Dowel bars shall be plain steel bars conforming to ASTM A615 and shall be free from burring or other deformation restricting slippage in the concrete.

a. Dowel Bars. Before delivery to the construction site each dowel bar shall be epoxy coated per ASTM A1078, Type 1, with a coating thickness after curing greater than 10 mils. Patched ends are not required for Type 1 coated dowels. The dowels shall be coated with a bond-breaker recommended by the manufacturer. Dowel sleeves or inserts are not permitted. Grout retention rings shall be fully circular metal or plastic devices capable of supporting the dowel until the grout hardens.

b. Tie Bars. Tie bars shall be deformed steel bars and conform to the requirements of ASTM A615. Tie bars designated as Grade 60 in ASTM A615 or ASTM A706 shall be used for construction requiring bent bars.

501-2.8 Water. Water used in mixing or curing shall be potable. If water is taken from other sources considered non-potable, it shall meet the requirements of ASTM C1602.

501-2.9 Material for curing concrete. Curing materials shall conform to one of the following specifications:

a. Liquid membrane-forming compounds for curing concrete shall conform to the requirements of

ASTM C309, Type 2, Class A, or Class B.

b. White polyethylene film for curing concrete shall conform to the requirements of ASTM C171.

c. White burlap-polyethylene sheeting for curing concrete shall conform to the requirements of ASTM C171.

501-2.10 Admixtures. Admixtures shall conform to the following specifications:

a. **Air-entraining admixtures.** Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entraining agent and any water reducer admixture shall be compatible.

b. **Water-reducing admixtures.** Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D.

c. **Other admixtures.** The use of set retarding and set-accelerating admixtures shall be approved by the APM prior to developing the concrete mix. Retarding admixtures shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating admixtures shall meet the requirements of ASTM C494, Type

C. Calcium chloride and admixtures containing calcium chloride shall not be used.

d. **Lithium Nitrate.** The lithium admixture shall be a nominal 30% aqueous solution of Lithium Nitrate, with a density of 10 pounds/gallon (1.2 kg/L), and shall have the approximate chemical form as shown below:

Lithium Admixture:

Constituent	Limit (Percent by Mass)
LiNO ₃ (Lithium Nitrate)	30 ±0.5
SO ₄ (Sulfate Ion)	0.1 (max)
Cl (Chloride Ion)	0.2 (max)
Na (Sodium Ion)	0.1 (max)
K (Potassium Ion)	0.1 (max)

The lithium nitrate admixture dispensing and mixing operations shall be verified and certified by the lithium manufacturer's representative.

501-2.11 Epoxy-resin. All epoxy-resin materials shall be two-component materials conforming to the requirements of ASTM C881, Class as appropriate for each application temperature to be encountered, except that in addition, the materials shall meet the following requirements:

a. Material for use for embedding dowels and anchor bolts shall be Type IV, Grade 3.

b. Material for use as patching materials for complete filling of spalls and other voids and for use in preparing epoxy resin mortar shall be Type III, Grade as approved.

c. Material for use for injecting cracks shall be Type IV, Grade 1.

d. Material for bonding freshly mixed Portland cement concrete or mortar or freshly mixed epoxy resin concrete or mortar to hardened concrete shall be Type V, Grade as approved.

501-2.12 Bond Breaker. Choke stone shall be an ASTM C33 Number 89 stone or Number 9.

30.3 CONCRETE MIX

501-3.1. General. No concrete shall be placed until an acceptable concrete mix has been submitted to the APM for review and the APM has taken appropriate action. The APM's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

501-3.2 Concrete Mix Laboratory. The laboratory used to develop the concrete mix shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the concrete mix must be included in the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the APM prior to start of construction.

501-3.3 Concrete Mix Proportions. Develop the mix using the procedures contained in Portland Cement Association (PCA) publication, "Design and Control of Concrete Mixtures." Concrete shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in paragraph 501-6.6 for a flexural strength of **650** psi per ASTM C78.

The minimum cementitious material shall be adequate to ensure a workable, durable mix. The minimum cementitious material (cement plus fly ash, or slag cement) shall be **470** pounds per cubic yard per cubic meter. The ratio of water to cementitious material, including free surface moisture on the aggregates but not including moisture absorbed by the aggregates shall be between **0.38 – 0.45** by weight.

Flexural strength test specimens shall be prepared in accordance with ASTM C192 and tested in accordance with ASTM C78. At the start of the project, the Contractor shall determine an allowable slump as determined by ASTM C143 not to exceed 2 inches (50 mm) for slip-form placement. For fixed-form placement, the slump shall not exceed 3 inches (75 mm). For hand placement, the slump shall not exceed 4 inches (100 mm).

The results of the concrete mix shall include a statement giving the maximum nominal coarse aggregate size and the weights and volumes of each ingredient proportioned on a one cubic yard (meter) basis. Aggregate quantities shall be based on the mass in a saturated surface dry condition.

If a change in source(s) is made, or admixtures added or deleted from the mix, a new concrete mix must be submitted to the APM for approval.

The APM may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

501-3.4 Concrete Mix submittal. The concrete mix shall be submitted to the APM at least 30 days prior to the start of operations, unless approved by the APM. The submitted concrete mix shall not be more than 180 days old and must use the materials to be used for production for the project. Production shall not begin until the concrete mix is approved in writing by the APM.

Each of the submitted concrete mixes (i.e, slip form, side form machine finish and side form hand finish) shall be stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items and quantities as a minimum:

- Certified material test reports for aggregate in accordance with paragraph 501-2.1. Certified reports must include all tests required; reporting each test, test method, test result, and requirement specified (criteria).
- Combined aggregate gradations and analysis; and including plots of the fine aggregate fineness modulus.
- Reactivity Test Results.
- Coarse aggregate quality test results, including deleterious materials.
- Fine aggregate quality test results, including deleterious materials.
- Mill certificates for cement and supplemental cementitious materials.
- Certified test results for all admixtures, including Lithium Nitrate if applicable.
- Specified flexural strength, slump, and air content.
- Recommended proportions/volumes for proposed mixture and trial water-cementitious materials ratio, including actual slump and air content.
- Flexural and compressive strength summaries and plots, including all individual beam and cylinder breaks.
- Correlation ratios for acceptance testing and Contractor QC testing, when applicable.
- Historical record of test results documenting production standard deviation, when applicable.

501-3.5 Cementitious materials.

a. Fly ash. When fly ash is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If fly ash is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement may be used. The slag cement, or slag cement plus fly ash if both are used, may constitute between 25 to 55% of the total cementitious material by weight.

c. Raw or calcined natural pozzolan. Natural pozzolan may be used in the concrete mix. When pozzolan is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If pozzolan is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

501-3.6 Admixtures.

a. Air-entraining admixtures. Air-entraining admixture are to be added in such a manner that will ensure uniform distribution of the agent throughout the batch. The air content of freshly mixed air-entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce concrete of the required plasticity and workability. The percentage of air in the mix shall be **2.5%**. Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse

aggregate and ASTM C173 for slag and other highly porous coarse aggregate.

b. Water-reducing admixtures. Water-reducing admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.

c. Other admixtures. Set controlling, and other approved admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted with the materials to be used in the work, in accordance with ASTM C494.

d. Lithium nitrate. Lithium nitrate shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements in accordance with paragraph 501-2.10d.

30.4 CONSTRUCTION METHODS

501-4.1 Control Strip. The control strip(s), if required by the APM, shall be to the next planned joint after the initial 250 feet of each type of pavement construction (slip-form pilot lane, slip-form fill-in lane, or fixed form). The Contractor shall demonstrate, in the presence of the APM, that the materials, concrete mix, equipment, construction processes, and quality control processes meet the requirements of the specifications. The concrete mixture shall be extruded from the paver meeting the edge slump tolerance and with little or no finishing. Pilot, fill-in, and fixed-form control strips will be accepted separately. Minor adjustments to the mix design may be required to place an acceptable control strip. The production mix will be the adjusted mix design used to place the acceptable control strip. Upon acceptance of the control strip by the APM, the Contractor must use the same equipment, materials, and construction methods for the remainder of concrete paving. Any adjustments to processes or materials must be approved in advance by the APM. Acceptable control strips will meet edge slump tolerance and surface acceptable with little or no finishing, air content within action limits, strength equal or greater than requirements of P501-3.3. The control strip will be considered one lot for payment (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 501-8.1 using a lot pay factor equal to 100.

501-4.2 Equipment. The Contractor is responsible for the proper operation and maintenance of all equipment necessary for handling materials and performing all parts of the work to meet this specification.

a. Plant and equipment. The plant and mixing equipment shall conform to the requirements of ASTM C94 and/or ASTM C685. Each truck mixer shall have attached in a prominent place a manufacturer's nameplate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades. The truck mixers shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pickup and throwover blades shall be replaced when they have worn down 3/4 inch (19 mm) or more. The Contractor shall have a copy of the manufacturer's design on hand showing dimensions and arrangement of blades in reference to original height and depth.

Equipment for transferring and spreading concrete from the transporting equipment to the paving lane in front of the finishing equipment shall be provided. The equipment shall be specially manufactured, self-propelled transfer equipment which will accept the concrete outside the paving lane and will spread it evenly

across the paving lane in front of the paver and strike off the surface evenly to a depth which permits the paver to operate efficiently.

b. Finishing equipment.

(1) Slip-form. The standard method of constructing concrete pavements shall be with an approved slip-form paving equipment designed and operated to spread, consolidate, screed, and finish the freshly placed concrete in one complete pass of the machine so that the end result is a dense and homogeneous pavement which is achieved with a minimum of hand finishing. The paver-finisher shall be a heavy duty, self-propelled machine designed specifically for paving and finishing high quality concrete pavements.

(2) Fixed-form. On projects requiring less than 10,000 cubic yards of concrete pavement or irregular areas at locations inaccessible to slip-form paving equipment, concrete pavement may be placed with equipment specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the APM. Hand screeding and float finishing may only be used on small irregular areas as allowed by the APM.

c. Vibrators. Vibrator shall be the internal type. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation or voids. The number, spacing, and frequency shall be as necessary to provide a dense and homogeneous pavement and meet the recommendations of American Concrete Institute (ACI) 309R, Guide for Consolidation of Concrete. Adequate power to operate all vibrators shall be available on the paver. The vibrators shall be automatically controlled so that they shall be stopped as forward motion ceases. The Contractor shall provide an electronic or mechanical means to monitor vibrator status. The checks on vibrator status shall occur a minimum of two times per day or when requested by the APM.

Handheld vibrators may only be used in irregular areas and shall meet the recommendations of ACI 309R, Guide for Consolidation of Concrete.

d. Concrete saws. The Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions. The Contractor shall provide at least one standby saw in good working order and a supply of saw blades at the site of the work at all times during sawing operations.

e. Fixed forms. Straight side fixed forms shall be made of steel and shall be furnished in sections not less than 10 feet (3 m) in length. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the APM. The top face of the form shall not vary from a true plane more than 1/8 inch (3 mm) in 10 feet (3 m), and the upstanding leg shall not vary more than 1/4 inch (6 mm). The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when approved by the APM. The forms shall extend the full depth of the pavement section.

501-4.3 Form setting. Forms shall be set to line and grade as shown on the plans, sufficiently in advance of the concrete placement, to ensure continuous paving operation. Forms shall be set to withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the concrete placement.

501-4.4 Base surface preparation prior to placement. Any damage to the prepared base, subbase, and subgrade shall be corrected full depth by the Contractor prior to concrete placement. The underlying surface shall be entirely free of frost when concrete is placed. The prepared grade shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from concrete. Bond breaker shall be applied to the surface of lean concrete base in a nominal 1/4 inch to prevent bonding between the PCC pavement and the concrete base in accordance with 501-2.12.

501-4.5 Handling, measuring, and batching material. Aggregate stockpiles shall be constructed and managed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. Store and maintain all aggregates at a uniform moisture content prior to use. A continuous supply of materials shall be provided to the work to ensure continuous placement.

501-4.6 Mixing concrete. The concrete may be mixed in a central mix plant or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time all materials are placed into the drum until the drum is emptied into the truck. All concrete shall be mixed and delivered to the site in accordance with the requirements of ASTM C94 or ASTM C685.

Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or non-agitating trucks. The elapsed time from the addition of cementitious material to the mix until the concrete is discharged from the truck should not exceed **30** minutes when the concrete is hauled in non-agitating trucks, nor 90 minutes when the concrete is hauled in truck mixers or truck agitators. In no case shall the temperature of the concrete when placed exceed 90°F (32°C). Retempering concrete by adding water or by other means will not be permitted. With transit mixers additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements provided the addition of water is performed within 45 minutes after the initial mixing operations and provided the water/cementitious ratio specified is not exceeded.

501-4.7 Weather Limitations on mixing and placing. No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

a. Cold weather. Unless authorized in writing by the APM, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 40°F (4°C) and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35°F (2°C).

The aggregate shall be free of ice, snow, and frozen lumps before entering the mixer. The temperature of the mixed concrete shall not be less than 50°F (10°C) at the time of placement. Concrete shall not be placed on frozen material nor shall frozen aggregates be used in the concrete.

When concreting is authorized during cold weather, water and/or the aggregates may be heated to not more than 150°F (66°C). The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials.

Curing during cold weather shall be in accordance with paragraph 501-4.13d.

b. Hot weather. During periods of hot weather when the maximum daily air temperature exceeds 85°F (30°C), the following precautions shall be taken.

The forms and/or the underlying surface shall be sprinkled with water immediately before placing the concrete. The concrete shall be placed at the coolest temperature practicable, and in no case shall the temperature of the concrete when placed exceed 90°F (32°C). The aggregates and/or mixing water shall be cooled as necessary to maintain the concrete temperature at or not more than the specified maximum.

The concrete placement shall be protected from exceeding an evaporation rate of 0.2 psf per hour. When conditions are such that problems with plastic cracking can be expected, and particularly if any plastic cracking begins to occur, the Contractor shall immediately take such additional measures as necessary to protect the concrete surface. If the Contractor's measures are not effective in preventing plastic cracking, paving operations shall be immediately stopped.

Curing during hot weather shall be in accordance with paragraph 501-4.13e.

c. Temperature management program. Prior to the start of paving operation for each day of paving, the Contractor shall provide the APM with a Temperature Management Program for the concrete to be placed to assure that uncontrolled cracking is avoided. (Federal Highway Administration HIPERPAV 3 is one example of a temperature management program.) As a minimum, the program shall address the following items:

(1) Anticipated tensile strains in the fresh concrete as related to heating and cooling of the concrete material.

(2) Anticipated weather conditions such as ambient temperatures, wind velocity, and relative humidity; and anticipated evaporation rate using Figure 19-9, PCA, Design and Control of Concrete Mixtures.

(3) Anticipated timing of initial sawing of joint.

(4) Anticipated number and type of saws to be used.

d. Rain. The Contractor shall have available materials for the protection of the concrete during inclement weather. Such protective materials shall consist of rolled polyethylene sheeting at least 4 mils (0.1 mm) thick of sufficient length and width to cover the plastic concrete slab and any edges. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the plastic concrete surface. When rain appears imminent, all paving operations shall stop and all available personnel shall begin covering the surface of the unhardened concrete with the protective covering.

501-4.8 Concrete Placement. At any point in concrete conveyance, the free vertical drop of the concrete from one point to another or to the underlying surface shall not exceed 3 feet. The finished concrete product must be dense and homogeneous, without segregation and conforming to the standards in this specification. Backhoes and grading equipment shall not be used to distribute the concrete in front of the paver. Front end loaders will not be used. All concrete shall be consolidated without voids or segregation, including under and around all load-transfer devices, joint assembly units, and other features embedded in the pavement. Hauling equipment or other mechanical equipment can be permitted on adjoining previously constructed pavement when the concrete strength reaches a flexural strength of **550 psi**, based on the average of four field cured specimens per 2,000 cubic yards of concrete placed. The Contractor must determine that the above minimum strengths are adequate to protect the pavement from overloads due to the construction equipment proposed for the project.

The Contractor shall have available materials for the protection of the concrete during cold, hot and/or inclement weather in accordance with paragraph 501-4.7.

a. Slip-form construction. The concrete shall be distributed uniformly into final position by a self-propelled slip-form paver without delay. The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose. The paver shall vibrate the concrete for the full width and depth of the strip of pavement being placed and the vibration shall be adequate to provide a consistency of concrete that will stand normal to the surface with sharp well-defined edges. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms. The plastic concrete shall be effectively consolidated by internal vibration with transverse vibrating units for the full width of the pavement and/or a series of equally placed longitudinal vibrating units. The space from the outer edge of the pavement to longitudinal unit shall not exceed 9 inches (23 cm) for slipform and at the end of the dowels for the fill-in lanes. The spacing of internal units shall be uniform and shall not exceed 18 inches (0.5 m).

The term internal vibration means vibrating units located within the specified thickness of pavement section.

The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without, segregation, voids, or vibrator trails and the amplitude of vibration shall be sufficient to be perceptible on the surface of the concrete along the entire length of the vibrating unit and for a distance of at least one foot (30 cm). The frequency of vibration or amplitude should be adjusted proportionately with the rate of travel to result in a uniform density and air content. The paving machine shall be equipped with a tachometer or other suitable device for measuring and indicating the actual frequency of vibrations.

The concrete shall be held at a uniform consistency. The slip-form paver shall be operated with as nearly a continuous forward movement as possible and all operations of mixing, delivering, and spreading concrete shall be coordinated to provide uniform progress with stopping and starting of the paver held to a minimum. If for any reason, it is necessary to stop the forward movement of the paver, the vibratory and tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

When concrete is placed adjacent to an existing pavement, that part of the equipment which is supported on the existing pavement shall be equipped with protective pads on crawler tracks or rubber-tired wheels on which the bearing surface is offset to run a sufficient distance from the edge of the pavement to avoid breaking the pavement edge.

Not more than 15% of the total free edge of each 500-foot (150 m) segment of pavement, or fraction thereof, shall have an edge slump exceeding 1/4 inch (6 mm), and none of the free edge of the pavement shall have an edge slump exceeding 3/8 inch (9 mm). (The total free edge of 500 feet (150 m) of pavement will be considered the cumulative total linear measurement of pavement edge originally constructed as nonadjacent to any existing pavement; that is, 500 feet (150 m) of paving lane originally constructed as a separate lane will have 1,000 feet (300 m) of free edge, 500 feet (150 m) of fill-in lane will have no free edge, etc.). The area affected by the downward movement of the concrete along the pavement edge shall be limited to not more than 18 inches (0.5 m) from the edge.

When excessive edge slump cannot be corrected before the concrete has hardened, the area with excessive edge slump will be removed the full width of the slip form lane and replaced at the expense of the Contractor as directed by the APM.

b. Fixed-form construction. Forms shall be drilled in advance of being placed to line and grade to accommodate tie bars / dowel bars where these are specified.

Immediately in advance of placing concrete and after all subbase operations are completed, side forms shall be trued and maintained to the required line and grade for a distance sufficient to prevent delay in placing.

Side forms shall remain in place at least 12 hours after the concrete has been placed, and in all cases until the edge of the pavement no longer requires the protection of the forms. Curing compound shall be applied to the concrete immediately after the forms have been removed.

Side forms shall be thoroughly cleaned and coated with a release agent each time they are used and before concrete is placed against them.

Concrete shall be spread, screed, shaped and consolidated by one or more self-propelled machines. These machines shall uniformly distribute and consolidate concrete without segregation so that the completed pavement will conform to the required cross-section with a minimum of handwork.

The number and capacity of machines furnished shall be adequate to perform the work required at a rate equal to that of concrete delivery. The equipment must be specifically designed for placement and finishing using stationary side forms. Methods and equipment shall be reviewed and accepted by the APM.

Concrete for the full paving width shall be effectively consolidated by internal vibrators. The rate of vibration of each vibrating unit shall be sufficient to consolidate the pavement without segregation, voids, or leaving vibrator trails.

Power to vibrators shall be connected so that vibration ceases when forward or backward motion of the machine is stopped.

c. Consolidation. Concrete shall be consolidated with the specified type of lane-spanning, gang-mounted, mechanical, immersion type vibrating equipment mounted in front of the paver, supplemented, in rare instances as specified, by hand-operated vibrators. The vibrators shall be inserted into the concrete to a depth that will provide the best full-depth consolidation but not closer to the underlying material than 2 inches (50 mm). Vibrators shall not be used to transport or spread the concrete. For each paving train, at least one additional vibrator spud, or sufficient parts for rapid replacement and repair of vibrators shall be maintained at the paving site at all times. Any evidence of inadequate consolidation (honeycomb along the edges, large air pockets, or any other evidence) or over-consolidation (vibrator trails, segregation, or any other evidence) shall require the immediate stopping of the paving operation and adjustment of the equipment or procedures as approved by the APM.

If a lack of consolidation of the hardened concrete is suspected by the APM, referee testing may be required. Referee testing of hardened concrete will be performed by the APM by cutting cores from the finished pavement after a minimum of 24 hours curing. The APM shall visually examine the cores for evidence of lack of consolidation. Density determinations will be made by the APM based on the water content of the core as taken. ASTM C642 shall be used for the determination of core density in the saturated- surface dry condition. When required, referee cores will be taken at the minimum rate of one for each 500 cubic yards of pavement, or fraction. The Contractor shall be responsible for all referee testing cost if they fail to meet the required density.

The average density of the cores shall be at least 97% of the original concrete mix density, with no cores having a density of less than 96% of the original concrete mix density. Failure to meet the referee tests will be considered evidence that the minimum requirements for vibration are inadequate for the job conditions. Additional vibrating units or other means of increasing the effect of vibration shall be employed so that the density of the hardened concrete conforms to the above requirements.

501-4.9 Strike-off of concrete and placement of reinforcement. Following the placing of the concrete, it shall be struck off to conform to the cross-section shown on the plans and to an elevation that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the plans. When reinforced concrete pavement is placed in two layers, the bottom layer shall be struck off to such length and depth that the sheet of reinforcing steel fabric or bar mat may be laid full length on the concrete in its final

position without further manipulation. The reinforcement shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off, and screed. If any portion of the bottom layer of concrete has been placed more than 30 minutes without being covered with the top layer or if initial set has taken place, it shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be positioned in advance of concrete placement or it may be placed in plastic concrete by mechanical or vibratory means after spreading.

Reinforcing steel, at the time concrete is placed, shall be free of mud, oil, or other organic matter that may adversely affect or reduce bond. Reinforcing steel with rust, mill scale or a combination of both will be considered satisfactory, provided the minimum dimensions, weight, and tensile properties of a hand wire-brushed test specimen are not less than the applicable ASTM specification requirements.

501-4.10 Joints. Joints shall be constructed as shown on the plans and in accordance with these requirements. All joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the plans. Joints shall not vary more than 1/2-inch (12 mm) from their designated position and shall be true to line with not more than 1/4-inch (6 mm) variation in 10 feet (3 m). The surface across the joints shall be tested with a 12-foot (3 m) straightedge as the joints are finished and any irregularities in excess of 1/4 inch (6 mm) shall be corrected before the concrete has hardened. All joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the plans.

a. Construction. Longitudinal construction joints shall be slip-formed or formed against side forms as shown in the plans.

Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for more than 30 minutes or it appears that the concrete will obtain its initial set before fresh concrete arrives. The installation of the joint shall be located at a planned contraction or expansion joint. If placing of the concrete is stopped, the Contractor shall remove the excess concrete back to the previous planned joint.

b. Contraction. Contraction joints shall be installed at the locations and spacing as shown on the plans. Contraction joints shall be installed to the dimensions required by forming a groove or cleft in the top of the slab while the concrete is still plastic or by sawing a groove into the concrete surface after the concrete has hardened. When the groove is formed in plastic concrete the sides of the grooves shall be finished even and smooth with an edging tool. If an insert material is used, the installation and edge finish shall be according to the manufacturer's instructions. The groove shall be finished or cut clean so that spalling will be avoided at intersections with other joints. Grooving or sawing shall produce a slot at least 1/8 inch (3 mm) wide and to the depth shown on the plans.

c. Isolation (expansion). Isolation joints shall be installed as shown on the plans. The premolded filler of the thickness as shown on the plans, shall extend for the full depth and width of the slab at the joint. The filler shall be fastened uniformly along the hardened joint face with no buckling or debris between the filler and the concrete interface, including a temporary filler for the sealant reservoir at the top of the slab. The edges of the joint shall be finished and tooled while the concrete is still plastic.

d. Dowels and Tie Bars for Joints

(1) Tie bars. Tie bars shall consist of deformed bars installed in joints as shown on the plans. Tie bars shall be placed at right angles to the centerline of the concrete slab and shall be spaced at intervals shown on the plans. They shall be held in position parallel to the pavement surface and in the middle of the slab depth and within the tolerances in paragraph 501-4.10(f). When tie bars extend into an unpaved lane,

they may be bent against the form at longitudinal construction joints, unless threaded bolt or other assembled tie bars are specified. Tie bars shall not be painted, greased, or enclosed in sleeves. When slip-form operations call for tie bars, two-piece hook bolts can be installed.

(2) Dowel bars. Dowel bars shall be placed across joints in the proper horizontal and vertical alignment as shown on the plans. The dowels shall be coated with a bond-breaker or other lubricant recommended by the manufacturer and approved by the APM. Dowels bars at longitudinal construction joints shall be bonded in drilled holes.

(3) Placing dowels and tie bars. Horizontal spacing of dowels shall be within a tolerance of $\pm 3/4$ inch (19 mm). The vertical location on the face of the slab shall be within a tolerance of $\pm 1/2$ inch (12 mm). The method used to install dowels shall ensure that the horizontal and vertical alignment will not be greater than $1/4$ inch per foot (6 mm per 0.3 m), except for those across the crown or other grade change joints. Dowels across crowns and other joints at grade changes shall be measured to a level surface. Horizontal alignment shall be checked perpendicular to the joint edge. The portion of each dowel intended to move within the concrete or expansion cap shall be wiped clean and coated with a thin, even film of lubricating oil or light grease before the concrete is placed. Dowels shall be installed as specified in the following subparagraphs.

Dowels and tie bars shall not be placed closer than 0.6 times the dowel bar or tie bar length to the planned joint line. If the last regularly spaced longitudinal dowel and/or tie bar is closer than that dimension, it shall be moved away from the joint to a location 0.6 times the dowel bar and/or tie bar length, but not closer than 6 inches (150 mm) to its nearest neighbor.

(a) Contraction joints. Dowels and tie bars in longitudinal and transverse contraction joints within the paving lane shall be held securely in place by means of rigid metal frames or basket assemblies of an approved type. The basket assemblies shall be held securely in the proper location by means of suitable pins or anchors. Do not cut or crimp the dowel basket tie wires.

At the Contractor's option, dowels and tie bars in contraction joints may be installed by insertion into the plastic concrete using approved equipment and procedures per the paver manufacturer's design. Approval of installation methods will be based on the results of the control strip showing that the dowels and tie bars are installed within specified tolerances as verified by cores or non-destructive rebar location devices approved by the APM.

(b) Construction joints. Install dowels and tie bars by the cast-in-place or the drill-and-dowel method. Installation by removing and replacing in preformed holes will not be permitted. Dowels and tie bars shall be prepared and placed across joints where indicated, correctly aligned, and securely held in the proper horizontal and vertical position during placing and finishing operations, by means of devices fastened to the forms.

(c) Joints in hardened concrete. Install dowels in hardened concrete by bonding the dowels into holes drilled into the concrete. The concrete shall have cured for seven (7) days or reached a minimum flexural strength of 450 psi before drilling begins. Holes $1/8$ inch (3 mm) greater in diameter than the dowels shall be drilled into the hardened concrete using rotary-core drills. Rotary-percussion drills may be used, provided that excessive spalling does not occur. Spalling beyond the limits of the grout retention ring will require modification of the equipment and operation. Depth of dowel hole shall be within a tolerance of $\pm 1/2$ inch (12 mm) of the dimension shown on the drawings. On completion of the drilling operation, the dowel hole shall be blown out with oil-free, compressed air. Dowels shall be bonded in the drilled holes using epoxy resin. Epoxy resin shall be injected at the back of the hole before installing the

dowel and extruded to the collar during insertion of the dowel so as to completely fill the void around the dowel. Application by buttering the dowel will not be permitted. The dowels shall be held in alignment at the collar of the hole by means of a suitable metal or plastic grout retention ring fitted around the dowel.

e. Sawing of joints. Sawing shall commence, without regard to day or night, as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing and before uncontrolled shrinkage cracking of the pavement occurs and shall continue without interruption until all joints have been sawn. All slurry and debris produced in the sawing of joints shall be removed by vacuuming and washing. Curing compound or system shall be reapplied in the initial saw-cut and maintained for the remaining cure period.

Joints shall be cut in locations as shown on the plans. The initial joint cut shall be a minimum 1/8 inch (3 mm) wide and to the depth shown on the plans. Prior to placement of joint sealant or seals, the top of the joint shall be widened by sawing as shown on the plans.

501-4.11 Finishing. Finishing operations shall be a continuing part of placing operations starting immediately behind the strike-off of the paver. Initial finishing shall be provided by the transverse screed or extrusion plate. The sequence of operations shall be transverse finishing, longitudinal machine floating if used, straightedge finishing, edging of joints, and then texturing. Finishing shall be by the machine method. The hand method shall be used only on isolated areas of odd slab widths or shapes and in the event of a breakdown of the mechanical finishing equipment. Supplemental hand finishing for machine finished pavement shall be kept to an absolute minimum. Any machine finishing operation which requires appreciable hand finishing, other than a moderate amount of straightedge finishing, shall be immediately stopped and proper adjustments made or the equipment replaced. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Compensation shall be made for surging behind the screeds or extrusion plate and settlement during hardening and care shall be taken to ensure that paving and finishing machines are properly adjusted so that the finished surface of the concrete (not just the cutting edges of the screeds) will be at the required line and grade. Finishing equipment and tools shall be maintained clean and in an approved condition. At no time shall water be added to the surface of the slab with the finishing equipment or tools, or in any other way. Fog (mist) sprays or other surface applied finishing aids specified to prevent plastic shrinkage cracking, approved by the APM, may be used in accordance with the manufacturers requirements.

a. Machine finishing with slipform pavers. The slipform paver shall be operated so that only a very minimum of additional finishing work is required to produce pavement surfaces and edges meeting the specified tolerances. Any equipment or procedure that fails to meet these specified requirements shall immediately be replaced or modified as necessary. A self-propelled non-rotating pipe float may be used while the concrete is still plastic, to remove minor irregularities and score marks. Only one pass of the pipe float shall be allowed. Equipment, mixture, and/or procedures which produce more than 1/4 inch (6 mm) of mortar-rich surface shall be immediately modified as necessary to eliminate this condition or operations shall cease. Remove excessive slurry from the surface with a cutting straightedge and wipe off the edge. Any slurry which does run down the vertical edges shall be immediately removed by hand, using stiff brushes or scrapers. No slurry, concrete or concrete mortar shall be used to build up along the edges of the pavement to compensate for excessive edge slump, either while the concrete is plastic or after it hardens.

b. Machine finishing with fixed forms. The machine shall be designed to straddle the forms and shall be operated to screed and consolidate the concrete. Machines that cause displacement of the forms shall be replaced. The machine shall make only one pass over each area of pavement. If the equipment and procedures do not produce a surface of uniform texture, true to grade, in one pass, the operation shall be

immediately stopped and the equipment, mixture, and procedures adjusted as necessary.

c. Other types of finishing equipment. Clary screeds, other rotating tube floats, or bridge deck finishers are not allowed on mainline paving, but may be allowed on irregular or odd-shaped slabs, and near buildings or trench drains, subject to the APM's approval.

Bridge deck finishers shall have a minimum operating weight of 7500 pounds and shall have a transversely operating carriage containing a knock-down auger and a minimum of two immersion vibrators. Vibrating screeds or pans shall be used only for isolated slabs where hand finishing is permitted as specified, and only where specifically approved.

d. Hand finishing. Hand finishing methods will not be permitted, except under the following conditions: (1) in the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade and (2) in areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical.

e. Straightedge testing and surface correction. After the pavement has been struck off and while the concrete is still plastic, it shall be tested for trueness with a 12-foot (3.7-m) finishing straightedge swung from handles capable of spanning at least one-half the width of the slab. The straightedge shall be held in contact with the surface in successive positions parallel to the centerline and the whole area gone over from one side of the slab to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance in excess of 1/8 inch (3 mm) thick shall be removed from the surface of the pavement and wasted. Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the smoothness requirements. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and until the slab conforms to the required grade and cross-section. The use of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment.

501-4.12 Surface texture. The surface of the pavement shall be finished as designated below for all newly constructed concrete pavements. It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. The texture shall be uniform in appearance and approximately 1/16 inch (2 mm) in depth. Any imperfections resulting from the texturing operation shall be corrected to the satisfaction of the APM.

a. Brush or broom finish. Shall be applied when the water sheen has practically disappeared. The equipment shall operate transversely across the pavement surface.

b. Burlap drag finish. Burlap, at least 15 ounces per square yard (555 grams per square meter), will typically produce acceptable texture. To obtain a textured surface, the transverse threads of the burlap shall be removed approximately one foot (30 cm) from the trailing edge. A heavy buildup of grout on the burlap threads produces the desired wide sweeping longitudinal striations on the pavement surface.

c. Artificial turf finish. Not used.

501-4.13 Curing. Immediately after finishing operations are completed and bleed water is gone from the surface, all exposed surfaces of the newly placed concrete shall be cured for a 7-day cure period in accordance with one of the methods below. Failure to provide sufficient cover material of whatever kind the Contractor may elect to use, or lack of water to adequately take care of both curing and other requirements, shall be cause for immediate

suspension of concreting operations. The concrete shall not be left exposed for more than 1/2 hour during the curing period.

When a two-saw-cut method is used to construct the contraction joint, the curing compound shall be applied to the saw-cut immediately after the initial cut has been made. The sealant reservoir shall not be sawed until after the curing period has been completed. When the one cut method is used to construct the contraction joint, the joint shall be cured with wet rope, wet rags, or wet blankets. The rags, ropes, or blankets shall be kept moist for the duration of the curing period.

a. Impervious membrane method. Curing with liquid membrane compounds should not occur until bleed and surface moisture has evaporated. All exposed surfaces of the pavement shall be sprayed uniformly with white pigmented curing compound immediately after the finishing of the surface and before the set of the concrete has taken place. The curing compound shall not be applied during rainfall. Curing compound shall be applied by mechanical sprayers under pressure at the rate of one gallon to not more than 150 square feet. The spraying equipment shall be of the fully atomizing type equipped with a tank agitator. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. During application, the compound shall be stirred continuously by mechanical means. Hand spraying of odd widths or shapes and concrete surfaces exposed by the removal of forms will be permitted. When hand spraying is approved by the APM, a double application rate shall be used to ensure coverage. Should the film become damaged from any cause, including sawing operations, within the required curing period, the damaged portions shall be repaired immediately with additional compound or other approved means. Upon removal of side forms, the sides of the exposed slabs shall be protected immediately to provide a curing treatment equal to that provided for the surface.

b. White burlap-polyethylene sheets. Not used.

c. Water method. The entire area shall be covered with burlap or other water absorbing material. The material shall be of sufficient thickness to retain water for adequate curing without excessive runoff. The material shall be kept wet at all times and maintained for seven (7) days. When the forms are stripped, the vertical walls shall also be kept moist. It shall be the responsibility of the Contractor to prevent ponding of the curing water on the subbase.

d. Concrete protection for cold weather. Maintain the concrete at a temperature of at least 50°F (10°C) for a period of 72 hours after placing and at a temperature above freezing for the remainder of the 7-day curing period. The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather; and any concrete damaged shall be removed and replaced at the Contractor's expense.

e. Concrete protection for hot weather. Concrete should be continuous moisture cured for the entire curing period and shall commence as soon as the surfaces are finished and continue for at least 24 hours. However, if moisture curing is not practical beyond 24 hours, the concrete surface shall be protected from drying with application of a liquid membrane-forming curing compound while the surfaces are still damp. Other curing methods may be approved by the APM.

501-4.14 Removing forms. Unless otherwise specified, forms shall not be removed from freshly placed concrete until it has hardened sufficiently to permit removal without chipping, spalling, or tearing. After the forms have been removed, the sides of the slab shall be cured in accordance with paragraph 501-4.13.

If honeycombed areas are evident when the forms are removed, materials, placement, and consolidation methods must be reviewed and appropriate adjustments made to assure adequate consolidation at the edges of future concrete placements. Honeycombed areas that extend into the slab less than approximately 1 inch (25 mm), shall

be repaired with an approved grout, as directed by the APM. Honeycombed areas that extend into the slab greater than a depth of 1 inch (25 mm) shall be considered as defective work and shall be removed and replaced in accordance with paragraph 501-4.19.

501-4.15 Saw-cut grooving. If shown on the plans, grooved surfaces shall be provided in accordance with the requirements of Item P-621.

501-4.16 Sealing joints. The joints in the pavement shall be sealed in accordance with Item P-604 or P- 605 as required per plans.

501-4.17 Protection of pavement. The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by the Contractor's employees and agents until accepted by the APM. This shall include watchmen to direct traffic and the erection and maintenance of warning signs, lights, pavement bridges, crossovers, and protection of unsealed joints from intrusion of foreign material, etc. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense.

Aggregates, rubble, or other similar construction materials shall not be placed on airfield pavements. Traffic shall be excluded from the new pavement by erecting and maintaining barricades and signs until the concrete is at least seven (7) days old, or for a longer period if directed by the APM.

In paving intermediate lanes between newly paved pilot lanes, operation of the hauling and paving equipment will be permitted on the new pavement after the pavement has been cured for seven (7) days, the joints are protected, the concrete has attained a minimum field cured flexural strength of 450 psi, and the slab edge is protected.

All new and existing pavement carrying construction traffic or equipment shall be kept clean and spillage of concrete and other materials shall be cleaned up immediately.

Damaged pavements shall be removed and replaced at the Contractor's expense. Slabs shall be removed to the full depth, width, and length of the slab.

501-4.18 Opening to construction traffic. The pavement shall not be opened to traffic until test specimens molded and cured in accordance with ASTM C31 have attained a flexural strength of 450 pounds per square inch when tested in accordance with ASTM C78. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Prior to opening the pavement to construction traffic, all joints shall either be sealed or protected from damage to the joint edge and intrusion of foreign materials into the joint. As a minimum, backer rod or tape may be used to protect the joints from foreign matter intrusion.

501-4.19 Repair, removal, or replacement of slabs. New pavement slabs that are broken or contain cracks or are otherwise defective or unacceptable as defined by acceptance criteria in paragraph 501-6.6 shall be removed and replaced or repaired, as directed by the APM, at the Contractor's expense. Spalls along joints shall be repaired as specified. Removal of partial slabs is not permitted. Removal and replacement shall be full depth, shall be full width of the slab, and the limit of removal shall be normal to the paving lane and to each original transverse joint. The APM will determine whether cracks extend full depth of the pavement and may require cores to be drilled on the crack to determine depth of cracking. Such cores shall be have a diameter of 2 inches (50 mm) to 4 inches (100 mm), shall be drilled by the Contractor and shall be filled by the Contractor with a well consolidated concrete mixture bonded to the walls of the hole with a bonding agent, using approved procedures. Drilling of cores and refilling holes shall be at no expense to the Owner. Repair of cracks as described in this section shall not be allowed if in the opinion of the APM the overall condition of the pavement indicates that such repair is unlikely to achieve an acceptable and durable finished pavement. No repair of cracks shall be allowed in any

panel that demonstrates segregated aggregate with an absence of coarse aggregate in the upper 1/8 inch (3 mm) of the pavement surface. Reasons for removal and replacement of slabs may include:

- Slabs with honeycombed concrete anywhere in the slab.
- Slabs with excessive edge slump.
- Slabs with surface cracking visible on more than 15% of the surface area.
- Cracking within 6 inches of the joint edge which overlap the joint.
- Slabs with PWL values for strength less than 55 percent
- Slabs where thickness is determined to be more than ½ inch below design thickness.
- Slabs with repairs which are found to be unacceptable by the APM.
- Slabs not within grade limits.
- Slabs with other defects determined by the APM to be inconsistent with the approved slabs in the Test Section.

Spalls are defined as voids 1.5-cubic inch or larger, and shall be repaired per 501-4.19e.

a. Shrinkage cracks. Shrinkage cracks which do not exceed one-third of the pavement depth shall be cleaned and either high molecular weight methacrylate (HMWM) applied; or epoxy resin (Type IV, Grade 1) pressure injected using procedures recommended by the manufacturer and approved by the APM. Sandblasting of the surface may be required following the application of HMWM to restore skid resistance. Care shall be taken to ensure that the crack is not widened during epoxy resin injection. All epoxy resin injection shall take place in the presence of the APM. Shrinkage cracks which exceed one-third the pavement depth shall be treated as full depth cracks in accordance with paragraphs 501-4.19b and 501-19c.

b. Slabs with cracks through interior areas. Interior area is defined as that area more than 6 inches (150 mm) from either adjacent original transverse joint. The full slab shall be removed and replaced at no cost to the Owner, when there are any full depth cracks, or cracks greater than one-third the pavement depth, that extend into the interior area.

c. Cracks close to and parallel to joints. All full-depth cracks within 6 inches (150 mm) either side of the joint and essentially parallel to the original joints, shall be treated as follows.

(1) Full depth cracks and original joint not cracked. The full-depth crack shall be treated as the new joint and the original joint filled with an epoxy resin.

i. Full-depth crack. The joint sealant reservoir for the crack shall be formed by sawing to a depth of 3/4 inches (19 mm), $\pm 1/16$ inch (2 mm), and to a width of 5/8 inch (16 mm), $\pm 1/8$ inch (3 mm). The crack shall be sawed with equipment specially designed to follow random cracks. Any equipment or procedure which causes raveling or spalling along the crack shall be modified or replaced to prevent raveling or spalling. The joint shall be sealed with sealant in accordance with P-605 or as directed by the APM.

ii. Original joint. If the original joint sealant reservoir has been sawed out, the reservoir and as much of the lower saw cut as possible shall be filled with epoxy resin, Type IV, Grade 2, thoroughly tooled into the void using approved procedures.

If only the original narrow saw cut has been made, it shall be cleaned and pressure injected with epoxy resin, Type IV, Grade 1, using approved procedures.

Where a parallel crack goes part way across paving lane and then intersects and follows the original joint which is cracked only for the remained of the width, it shall be treated as specified above for a parallel crack, and the cracked original joint shall be prepared and sealed as originally designed.

(2) Full depth cracks and original joint cracked. If there is any place in the lane width where a parallel crack and a cracked portion of the original joint overlap, the entire slab containing the crack shall be removed and replaced.

d. Removal and replacement of full slabs. Make a full depth cut perpendicular to the slab surface along all edges of the slab with a concrete saw cutting any dowels or tie-bars. Remove damaged slab protecting adjacent pavement from damage. Damage to adjacent slabs may result in removal of additional slabs as directed by the APM at the Contractor's expense.

The underlying material shall be repaired, re-compacted and shaped to grade.

Dowels of the size and spacing specified for other joints in similar pavement on the project shall be installed along all four (4) edges of the new slab in accordance with paragraph 501-4.10d.

Placement of concrete shall be as specified for original construction. The joints around the new slab shall be prepared and sealed as specified for original construction.

e. Spalls along joints.

(1) Spalls less than one inch wide and less than the depth of the joint sealant reservoir, shall be filled with joint sealant material.

(2) Spalls larger than one inch and/or deeper than the joint reservoir, but less than 1/2 the slab depth, and less than 25% of the length of the adjacent joint shall be repaired as follows:

i. Make a vertical saw cut at least one inch (25 mm) outside the spalled area and to a depth of at least 2 inches (50 mm). Saw cuts shall be straight lines forming rectangular areas surrounding the spalled area.

ii. Remove unsound concrete and at least 1/2 inch (12 mm) of visually sound concrete between the saw cut and the joint or crack with a light chipping hammer.

iii. Clean cavity with high-pressure water jets supplemented with compressed air as needed to remove all loose material.

iv. Apply a prime coat of epoxy resin, Type III, Grade I, to the dry, cleaned surface of all sides and bottom of the cavity, except any joint face.

v. Fill the cavity with low slump concrete or mortar or with epoxy resin concrete or mortar.

vi. An insert or other bond-breaking medium shall be used to prevent bond at all joint faces.

vii. A reservoir for the joint sealant shall be sawed to the dimensions required for other joints, or as required to be routed for cracks. The reservoir shall be thoroughly cleaned and sealed with the sealer specified for the joints.

(3) Spalls deeper than 1/2 of the slab depth or spalls longer than 25% of the adjacent joint require replacement of the entire slab.

f. Diamond grinding of Concrete surfaces. Diamond grinding shall be completed prior to pavement grooving. Diamond grinding of the hardened concrete should not be performed until the concrete is at least 14 days old and has achieved full minimum strength. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the joints will not be permitted. The depth of diamond grinding shall not exceed 1/2 inch (13 mm) and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified.

Diamond grinding shall be performed with a machine specifically designed for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with sufficient number of flush cut blades that create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The Contractor shall determine the number and type of blades based on the hardness of the aggregate. Contractor shall demonstrate to the APM that the grinding equipment will produce satisfactory results prior to making corrections to surfaces.

Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. All grinding shall be at the expense of the Contractor.

g. The APM maintains the right to require complete removal of any defective slabs should the repairs are unacceptable. If repairs are deemed acceptable, the concrete pavement will be accepted with reduced payment. No payment will be made for any repairs, removals or replacement.

30.5 CONTRACTOR QUALITY CONTROL (CQC)

501-5.1 Quality control program. The Contractor shall develop a Quality Control Program in accordance with Item C-100. No partial payment will be made for materials that are subject to specific quality control requirements without an approved quality control program.

501-5.2 Contractor Quality Control (CQC). The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The APM shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The APM will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

501-5.3 Contractor QC testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to this specification and as set forth in the CQCP. The testing program shall include, but not necessarily be limited to, tests for aggregate gradation, aggregate moisture content, slump, and air content. A QC Testing Plan shall be developed and approved by the APM as part of the CQCP.

The APM may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination, segregation, or improper slump. Such rejection may be based on only visual inspection. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the APM, and if it can be demonstrated in the laboratory, in the presence of the APM, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

a. Fine aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C70 or ASTM C566.

(3) Deleterious substances. Fine aggregate as delivered to the mixer shall be tested for deleterious substances in fine aggregate for concrete as specified in paragraph 501-2.1b, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

b. Coarse Aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily for each size of aggregate. Tests shall be made in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C566.

(3) Deleterious substances. Coarse aggregate as delivered to the mixer shall be tested for deleterious substances in coarse aggregate for concrete as specified in paragraph 501-2.1c, prior to production of the control strip, and a minimum of every 30-days during production or more frequently as necessary to control deleterious substances.

c. Slump. One test shall be made for each subplot. Slump tests shall be performed in accordance with ASTM C143 from material randomly sampled from material discharged from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

d. Air content. One test shall be made for each subplot. Air content tests shall be performed in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag or other porous coarse aggregate, from material randomly sampled from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

e. Unit weight and Yield. One test shall be made for each subplot. Unit weight and yield tests shall be in accordance with ASTM C138. The samples shall be taken in accordance with ASTM C172 and at the same time as the air content tests.

f. Temperatures. Temperatures shall be checked at least four times per lot at the job site in accordance with ASTM C1064.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot “straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the APM.

Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using either the FAA profile program, ProFAA, or FHWA profile program ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet or more often as determined by the APM. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet; and at the third points of paving lanes when widths of paving lanes are 20 ft or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 501-4.19f or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 501-6.6.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade will be evaluated prior to and after placement of the concrete surface.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the APM within 48 hours. Areas with humps or depression that exceed grade or smoothness and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. If these areas cannot be corrected with grinding then the slabs that are retaining water must be removed and replaced in accordance with paragraph 501-4.19d. Grinding shall be in accordance with paragraph 501-4.19f. All corrections will be at the Contractors expense.

501-5.4 Control charts. The Contractor shall maintain linear control charts for fine and coarse aggregate gradation, slump, and air content. The Contractor shall also maintain a control chart plotting the coarseness factor/workability factor from the combined gradations in accordance with paragraph 501-2.1d.

Control charts shall be posted in a location satisfactory to the APM and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and suspension Limits, or Specification limits, applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a potential problem and the Contractor is not taking satisfactory corrective action, the APM may halt production or acceptance of the material.

a. Fine and coarse aggregate gradation. The Contractor shall record the running average of the last five gradation tests for each control sieve on linear control charts. Superimposed on the control charts shall be the action and suspension limits. Gradation tests shall be performed by the Contractor per ASTM C136. The Contractor shall take at least two samples per lot to check the final gradation. Sampling shall be per ASTM D75 from the flowing aggregate stream or conveyor belt.

b. Slump and air content. The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for slump and air content in accordance with the following Action and Suspension Limits.

c. Combined gradation. The Contractor shall maintain a control chart plotting the coarseness factor and workability factor on a chart in accordance with paragraph 501-2.1d.

Control Chart Limits¹

Control Parameter	Individual Measurements	
	Action Limit	Suspension Limit
Gradation ²	*3	*3
Coarseness Factor (CF)	±3.5	±5
Workability Factor (WF)	±2	±3
Slump	+0.5 to -1 inch (+13 to -25 mm)	+1 to -1.5 inch (+25 to -38 mm)
Air Content	±1.5%	±2.0%

¹ Control charts shall developed and maintained for each control parameter indicated.

² Control charts shall be developed and maintained for each sieve size.

³ Action and suspension limits shall be determined by the Contractor.

501-5.5 Corrective action at Suspension Limit. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of control. The CQCP shall detail what action will be taken to bring the process into control and shall contain sets of rules to gauge when a process is out of control. As a minimum, a process shall be deemed out of control and corrective action taken if any one of the following conditions exists.

- a. Fine and coarse aggregate gradation. When two consecutive averages of five tests are outside of the suspension limits, immediate steps, including a halt to production, shall be taken to correct the grading.
- b. Coarseness and Workability factor. When the CF or WF reaches the applicable suspension limits, the Contractor, immediate steps, including a halt to production, shall be taken to correct the CF and WF.
- c. Fine and coarse aggregate moisture content. Whenever the moisture content of the fine or coarse aggregate changes by more than 0.5%, the scale settings for the aggregate batcher and water batcher shall be adjusted.
- d. Slump. The Contractor shall halt production and make appropriate adjustments whenever:
 - (1) one point falls outside the Suspension Limit line for individual measurements
OR
 - (2) two points in a row fall outside the Action Limit line for individual measurements.
- d. Air content. The Contractor shall halt production and adjust the amount of air-entraining admixture whenever:
 - (1) one point falls outside the Suspension Limit line for individual measurements

OR

(2) two points in a row fall outside the Action Limit line for individual measurements.

30.6 MATERIAL ACCEPTANCE

501-6.1 Quality Assurance (QA) Acceptance sampling and testing. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section, with the exception of coring for thickness determination, will be performed by the APM. The Contractor shall provide adequate facilities for the initial curing of beams. The Contractor shall bear the cost of providing initial curing facilities and coring and filling operations, per paragraph 501-6.5b(1).

The samples will be transported while in the molds. The curing, except for the initial cure period, will be accomplished using the immersion in saturated lime water method. During the 24 hours after molding, the temperature immediately adjacent to the specimens must be maintained in the range of 60° to 80°F (16° to 27°C), and loss of moisture from the specimens must be prevented. The specimens may be stored in tightly constructed wooden boxes, damp sand pits, temporary buildings at construction sites, under wet burlap in favorable weather, or in heavyweight closed plastic bags, or using other suitable methods, provided the temperature and moisture loss requirements are met.

501-6.2 Quality Assurance (QA) testing laboratory. Quality assurance testing organizations performing these acceptance tests will be accredited in accordance with ASTM C1077. The quality assurance laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods will be submitted to the APM prior to start of construction.

501-6.3 Lot size. Concrete will be accepted for strength and thickness on a lot basis. A lot will consist of a day's production not to exceed 2,000 cubic yards square. Each lot will be divided into approximately equal sublots with individual sublots between 400 to 600 cubic yards. Where three sublots are produced, they will constitute a lot. Where one or two sublots are produced, they will be incorporated into the previous or next lot. Where more than one plant is simultaneously producing concrete for the job, the lot sizes will apply separately for each plant.

501-6.4 Partial lots. When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot or for overages or minor placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

Where three sublots have been produced, they will constitute a lot. Where one or two sublots have been produced, they will be incorporated into the next lot or the previous lot and the total number of sublots will be used in the acceptance criteria calculation, that is, $n=5$ or $n=6$.

501-6.5 Acceptance Sampling and Testing.

a. Strength.

(1) Sampling. One sample will be taken for each subplot from the concrete delivered to the job site. Sampling locations will be determined by the APM in accordance with random sampling procedures contained in ASTM D3665. The concrete will be sampled in accordance with ASTM C172.

(2) Test Specimens. The APM will be responsible for the casting, initial curing, transportation, and curing of specimens in accordance with ASTM C31. Two (2) specimens will be made from each sample

and slump, air content, unit weight, and temperature tests will be conducted for each set of strength specimens. Within 24 to 48 hours, the samples will be transported from the field to the laboratory while in the molds. Samples will be cured in saturated lime water.

The strength of each specimen will be determined in accordance with ASTM C78. The strength for each subplot will be computed by averaging the results of the two test specimens representing that subplot.

No other methods for determining the strength of the concrete will be used unless otherwise approved in advance by the APM.

(3) Acceptance. Acceptance of pavement for strength will be determined by the APM in accordance with paragraph 501-6.6b(1). All individual strength tests within a lot will be checked for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded and the remaining test values will be used to determine acceptance in accordance with paragraph 501-6.5b.

b. Pavement thickness.

(1) Sampling. One core will be taken by the Contractor for each subplot in the presence of the APM. Sampling locations will be determined by the APM in accordance with random sampling procedures contained in ASTM D3665. Areas, such as thickened edges, with planned variable thickness, will be excluded from sample locations.

Cores shall be a minimum 4 inch (100 mm) in diameter neatly cut with a core drill. The Contractor will furnish all tools, labor, and materials for cutting samples and filling the cored hole. Core holes will be filled by the Contractor with a non-shrink grout approved by the APM within one day after sampling.

(2) Testing. The thickness of the cores will be determined by the APM by the average caliper measurement in accordance with ASTM C174. Each core shall be photographed and the photograph included with the test report.

(3) Acceptance. Acceptance of pavement for thickness will be determined by the APM in accordance with paragraph 501-6.6.

501-6.6 Acceptance criteria.

a. General. Acceptance will be based on the following characteristics of the completed pavement discussed in paragraph 501-6.5b:

- (1) Strength**
- (2) Thickness**
- (3) Grade**
- (4) Profilograph smoothness – As required by paragraph (7) below.**
- (5) Adjustments for repairs and grinding**
- (6) Dowel bar alignment and position**
- (7) Profilograph smoothness and acceptance adjustment paragraphs only apply when the overall project is a new and/or reconstructed runway(s) and/or taxiway(s) greater than 500 feet in length. Any changes to the profilograph smoothness acceptance limits requires a modification to standards in accordance with FAA Order 5300.1, Modifications to Agency**

Airport Design, Construction, and Equipment Standards.

Acceptance for strength, thickness, and grade, will be based on the criteria contained in accordance with paragraph 501-6.6b(1), 501-6.6b(2), and 501-6.6b(3), respectively.

Acceptance for profilograph smoothness will be based on the criteria contained in paragraph 501- 6.6b(4) and 501-6.6b(7).

Production quality must achieve 90 PWL or higher to receive full payment.

Strength and thickness will be evaluated for acceptance on a lot basis using the method of estimating PWL. Production quality must achieve 90 PWL or higher to receive full pavement. The PWL will be determined in accordance with procedures specified in Item C-110.

The lower specification tolerance limit (L) for strength and thickness will be:

Lower Specification Tolerance Limit (L)

Strength	0.93 □ strength specified in paragraph 501-3.3
Thickness	Lot Plan Thickness in inches, - 0.50 in

b. Acceptance criteria.

(1) Strength. If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(2) Thickness. If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

Where the project has multiple small placements or the total project size is less than 2000 cubic yards, the use of percent within limits (PWL) will not be used and acceptable material will be paid for by the cubic yard per the following:

(1) Strength. The strength for each subplot shall be computed by averaging the results of that subplot. When subplot strength equals or exceeds the strength as specified in paragraph 501-3.3, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(2) Thickness. If subplot thickness is not be less than ½ inch (12 mm) from plan thickness, the lot will be acceptable. Acceptance and payment for the lot will be determined in accordance with paragraph 501-8.1.

(3) Grade. The final finished surface of the pavement of the completed project will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally. The documentation, stamped and signed by a licensed surveyor shall be in accordance with paragraph 501-5.3h. Payment for sublots that do not meet grade for over 25% of the subplot shall reduced by 5% and not be more than 95%.

(4) Profilograph roughness for QA Acceptance. Profilograph roughness and acceptance paragraphs only apply when the overall project is a new and/or reconstructed runway(s) and/or taxiway(s) greater than 500 feet in length. Profilograph roughness is not applicable to aprons.

The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the APM shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hrs of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2-inch (5 mm) blanking band. The bump template must span one inch (25 mm) with an offset of 0.4 inches (10 mm). The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch (25 mm) equals 25 feet and a vertical scale of one inch (25 mm) equals one inch (25 mm). Profilograph shall be performed one foot right and left of project centerline and 15 feet right and left of project centerline. Any areas that indicate "must grind" shall be corrected with diamond grinding per paragraph 501-4.19f or by removing and replacing full depth of surface course, as directed by the APM. Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10 mile or less.

(5) Adjustments for repair. Sublots with spall repairs, crack repairs, or partial panel replacement, will be limited to no more than 95% payment.

(6) Adjustment for grinding. For sublots with grinding over 25% of a subplot, payment will be reduced 5%.

(7) Dowel bar alignment and position. Dowel bars and assemblies shall be checked for position and alignment. The maximum permissible tolerance on dowel bar alignment is as described in 501-4.10 d.(3) If the dowel bar are determined to be out of alignment, the dowel bar shall be cut flush with the joint face, and new dowel bars installed a minimum 3 inches away from existing dowel bars.

30.7 METHOD OF MEASUREMENT

501-7.1 Concrete pavement shall be measured by the number of cubic yards of either plain or reinforced pavement as specified in-place, completed and accepted. Reinforcing steel shall be measured by the pound as specified in place and accepted.

30.8 BASIS OF PAYMENT

501-8.1 Payment. Payment for concrete pavement meeting all acceptance criteria as specified in paragraph 501-6.6. Acceptance Criteria shall be based on results of strength, smoothness where required, and thickness tests. Payment for acceptable lots of concrete pavement shall be adjusted in accordance with paragraph 501-8.1a for strength and thickness; 501-8.1b for repairs; 501-8.1c for grinding; and 501-8.1d for smoothness, subject to the limitation that:

The total project payment for concrete pavement shall not exceed **100** percent of the product of the contract unit price and the total number of cubic yards of concrete pavement used in the accepted work (See Note 1 under the Price Adjustment Schedule table below).

Payment shall be full compensation for all labor, materials, tools, equipment, and incidentals required to complete the work as specified herein and on the drawings.

a. Basis of adjusted payment. The pay factor for each individual lot shall be calculated in accordance with the Price Adjustment Schedule table below. A pay factor shall be calculated for both strength and thickness. The lot pay factor shall be the higher of the two values when calculations for both strength and thickness are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either strength or thickness is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both strength and thickness are less than 100%.

Price Adjustment Schedule¹

Percentage of Materials Within Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
96 – 100	106
90 – 95	PWL + 10
75 – 90	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject ²

¹ Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment in excess of 100% shall be subject to the total project payment limitation specified in paragraph 501-8.1.

² The lot shall be removed and replaced unless, after receipt of FAA concurrence, the Owner and Contractor agree in writing that the lot will remain; the lot paid at 50% of the contract unit price; and the total project payment limitation reduced by the amount withheld for that lot.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 501-8.1. Payment in excess of 100% for accepted lots of concrete pavement shall be used to offset payment for accepted lots of concrete pavement that achieve a lot pay factor less than 100%; except for rejected lots which remain in place and/or sublots with adjustments for repairs.

b. Adjusted payment for repairs. The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots which contain repairs in accordance with paragraph 501-4.19 on more than 20% of the slabs within the subplot. Payment factors greater than 100 percent for the strength and thickness cannot be used to offset adjustments for repairs.

c. Adjusted payment for grinding. The PWL lot pay factor shall be reduced by 5% and be no higher than 95% for sublots with grinding over 25% of a subplot.

d. Profilograph Roughness. Where required by paragraph 501-6.6 Acceptance criteria, the Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 501-

6.6b(4). When the final average profile index for the entire length of pavement does not exceed 15 inches per mile per 1/10 mile, payment will be made at the contract unit price for the completed pavement.

e. Payment shall be made under:

Item 54: Portland Cement Concrete Pavement – per cubic yard

Item 55: High Early Strength Portland Cement Concrete Pavement – per cubic yard

Item 56: Smooth Dowels – per pound

Item 57: Reinforcing Steel – per pound

30.9 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A996	Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ASTM A1035	Standard Specification for Deformed and Plain, Low-Carbon, Chromium, Steel Bars for Concrete Reinforcement
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A1078	Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement
ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate

ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C70	Standard Test Method for Surface Moisture in Fine Aggregate
ASTM C78	Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C123	Standard Test Method for Lightweight Particles in Aggregate
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C138	Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C227	Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C295	Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregates by Drying
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C642	Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064	Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis

ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface
American Concrete Institute (ACI)	
ACI 305R	Guide to Hot Weather Concreting
ACI 306R	Guide to Cold Weather Concreting
ACI 309R	Guide for Consolidation of Concrete
Advisory Circulars (AC)	
AC 150/5320-6	Airport Pavement Design and Evaluation
Federal Highway Administration (FHWA)	
HIPERPAV 3, version 3.2	
Portland Concrete Association (PCA)	
PCA	Design and Control of Concrete Mixtures, 16 th Edition
U.S. Army Corps of Engineers (USACE) Concrete Research Division (CRD)	

CRD C662

Determining the Potential Alkali-Silica Reactivity of Combinations of
Cementitious Materials, Lithium Nitrate Admixture and Aggregate
(Accelerated Mortar-Bar Method)

United States Air Force Engineering Technical Letter (ETL)

ETL 97-5

Proportioning Concrete Mixtures with Graded Aggregates for Rigid
Airfield Pavements

END ITEM P-501

31 ITEM P-602 EMULSIFIED ASPHALT PRIME COAT

31.1 DESCRIPTION

602-1.1 This item shall consist of an application of emulsified asphalt material on the prepared base course in accordance with these specifications and in reasonably close conformity to the lines shown on the plans. The type, grade, controlling specification, application rate and application temperature of the asphalt material shall be approved by the APM.

31.2 MATERIALS

602-2.1 Emulsified Asphalt material. The emulsified asphalt material shall be as specified in ASTM D3628 for use as a prime coat appropriate to local conditions. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt material. The COA shall be provided to and approved by the APM before the emulsified asphalt material is applied. The furnishing of the COA for the emulsified asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

31.3 CONSTRUCTION METHODS

602-3.1 Weather limitations. The emulsified asphalt prime coat shall be applied only when the existing surface is dry; the atmospheric temperature is 50°F (10°C) or above, and the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the APM.

602-3.2 Equipment. The equipment shall include a self-powered pressure asphalt material distributor and equipment for heating asphalt material.

Provide a distributor with pneumatic tires of such size and number that the load produced on the base surface does not exceed 65.0 psi (4.5 kg/sq cm) of tire width to prevent rutting, shoving or otherwise damaging the base, surface or other layers in the pavement structure. Design and equip the distributor to spray the asphalt material in a uniform coverage at the specified temperature, at readily determined and controlled rates from 0.05 to 1.0 gallons per square yard (0.23 to 4.5 L/square meter), with a pressure range of 25 to 75 psi (172.4 to 517.1 kPa) and with an allowable variation from the specified rate of not more than $\pm 5\%$, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying asphalt material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the asphalt material during the heating process. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

A power broom and power blower suitable for cleaning the surfaces to which the asphalt coat is to be applied shall be provided.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the APM.

602-3.3 Application of emulsified asphalt material. Immediately before applying the prime coat, the full width of the surface to be primed shall be swept with a power broom to remove all loose dirt and other objectionable material.

The asphalt emulsion material shall be uniformly applied with an asphalt distributor at the rate of 0.15 to 0.30 gallons per square yard (0.68 to 1.36 liters per square meter) depending on the base course surface texture. The type of asphalt material and application rate shall be approved by the APM prior to application.

Following application of the emulsified asphalt material and prior to application of the succeeding layer of pavement, allow the asphalt coat to cure and to obtain evaporation of any volatiles or moisture. Maintain the coated surface until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread sand to effectively blot up and cure excess asphalt material. The Contractor shall remove blotting sand prior to asphalt concrete lay down operations at no additional expense to the Owner. Keep traffic off surfaces freshly treated with asphalt material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

602-3.4 Trial application rates. The Contractor shall apply a minimum of three lengths of at least 100 feet (30 m) for the full width of the distributor bar to evaluate the amount of emulsified asphalt material that can be satisfactorily applied with the equipment. Apply three different application rates of emulsified asphalt materials within the application range specified in paragraph 602-3.3. Other trial applications can be made using various amounts of material as directed by the APM. The trial application is to demonstrate the equipment can uniformly apply the emulsified asphalt material within the rates specified and determine the application rate for the project.

602-3.5 Freight and waybills. The Contractor shall submit waybills and delivery tickets during the progress of the work. Before the final estimate is allowed, file with the APM certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

31.4 METHOD OF MEASUREMENT

602-4.1 The emulsified asphalt material for prime coat shall be measured by the gallon. Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D4311. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

31.5 BASIS OF PAYMENT

602-5.1 Payment shall be made at the contract unit price per gallon for emulsified asphalt prime coat. This price shall be full compensation for furnishing all materials and for all preparation, delivering, and applying the materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item 58:	Emulsified Asphalt Prime Coat – per gallon

31.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

END OF ITEM P-602

32 ITEM P-603 EMULSIFIED ASPHALT TACK COAT

32.1 DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans. The type, grade, controlling specification, application rate and application temperature of the asphalt material shall be approved by the APM.

32.2 MATERIALS

603-2.1 Asphalt materials. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the APM before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

32.3 CONSTRUCTION METHODS

603-3.1 Weather limitations. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the APM.

603-3.2 Equipment. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray- bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the APM.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

603-3.3 Application of emulsified asphalt material. The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the APM prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the APM. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

603-3.4 Freight and waybills The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the APM certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

32.4 METHOD OF MEASUREMENT

603-4.1 The emulsified asphalt material for tack coat shall be measured by the gallon. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

32.5 BASIS OF PAYMENT

603.5-1 Payment shall be made at the contract unit price per gallon of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 59:	Emulsified Asphalt Tack Coat, per gallon

32.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

END ITEM P-603

33 ITEM P-608 EMULSIFIED ASPHALT SEAL COAT

33.1 DESCRIPTION

608-1.1 This item shall consist of the application of a emulsified asphalt surface treatment composed of an emulsion of natural and refined asphalt materials, water and a polymer additive, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the plans or as directed by the APM. The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term emulsified asphalt means an emulsion of natural and refined asphalt materials.

33.2 MATERIALS

608-2.1 Aggregate. The aggregate material shall be a dry, clean, dust and dirt free, sound, durable, angular shaped manufactured specialty sand, such as that used as an abrasive, with a Mohs hardness of 6 to 8. The Contractor shall submit the specialty sand manufacturer's technical data and a manufacturer's Certificate of Analysis (COA) indicating that the specialty sand meets the requirements of the specification to the APM prior to start of construction. The sand must be approved for use by the APM and shall meet the following gradation limits when tested in accordance with ASTM C136 and ASTM C117:

Aggregate Material Gradation Requirements¹

Sieve Designation (square openings)	Individual Percentage Retained by Weight
No. 10 (2.00 mm)	0
No. 14 (1.41 mm)	0-4
No. 16 (1.18 mm)	0-8
No. 20 (850 µm)	0-35
No. 30 (600 µm)	20-50
No. 40 (425 µm)	10-45
No. 50 (300 µm)	0-20
No. 70 (212 µm)	0-5
No. 100 (150 µm)	0-2
No. 200 (75 µm)	0-2

¹ Locally available sand or abrasive material that is slightly outside of the gradation requirements may be approved by the APM with concurrence by the seal coat

manufacturer for the use of locally available sand or abrasive material. The APM and manufacturer's field representative should verify acceptance during application of Control strips indicated under paragraph 608-3.2.

The Contractor shall provide a certification showing particle size analysis and properties of the material delivered for use on the project. The Contractor's certification may be subject to verification by testing the material delivered for use on the project.

608-2.2 Asphalt Emulsion. The asphalt emulsion shall meet the properties in the following table:

Concentrated Asphalt Emulsion Properties

Properties	Specification	Limits
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	20 – 100 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	57% minimum
Sieve Test	ASTM D6933	0.1% maximum
24-hour Stability	ASTM D6930	1% maximum
5-day Settlement Test	ASTM D6930	5.0% maximum
Particle Charge ¹	ASTM D7402	Positive 6.5 maximum pH

¹ pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, asphalt emulsions.

The asphalt material base residue shall contain not less than 20% gilsonite, or uintaite and shall not contain any tall oil pitch or coal tar material and shall contain no less than one percent (1%) polymer.

Tests on Residue from Distillation or Evaporation

Properties	Specification	Limits
Viscosity at 275°F (135°C)	ASTM D4402	1750 cts maximum
Solubility in 1, 1, 1 trichloroethylene	ASTM D2042	97.5% minimum
Penetration	ASTM D5	50 dmm maximum
Asphaltenes	ASTM D2007	15% minimum
Saturates	ASTM D2007	15% maximum
Polar Compounds	ASTM D2007	25% minimum
Aromatics	ASTM D2007	15% minimum

The asphalt emulsion, when diluted in the volumetric proportion of one part concentrated asphalt material to one part hot water or two parts concentrated asphalt material to one part hot water shall have the following properties:

One-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, one part concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	28.5% minimum
Pumping Stability ¹		Pass

¹ Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

Two-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, two parts concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	38% minimum
Pumping Stability ¹		Pass

¹ Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the APM before the emulsified asphalt is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be intended as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

The asphalt material storage and handling temperature shall be between 50°F - 160°F (10°C - 70°C) and the material shall be protected from freezing, or whenever outside temperature drops below 40°F (4°C) for prolonged time periods.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

608-2.3 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. Water used in making and diluting the emulsion shall be potable, with a maximum hardness of 90ppm calcium and 15ppm magnesium; deleterious iron, sulfates, and phosphates maximum 7ppm, and less than 1ppm of organic byproducts. Water shall be a minimum of 140°F (60°C) prior to adding to emulsion.

608-2.4 Polymer. The polymer shall meet the properties in the following table:

Polymer Properties

Properties	Limits
Solids Content	47% to 65%, Percent by Weight
Weight	8.0 to 9.0 pounds/gallon (1.07 to 1.17 kg/L)
pH	3.0 to 8.0
Particle Charge	Nonionic/Cationic
Mechanical Stability	Excellent
Film Forming Temperature, °C	+5°C, minimum
Tg, °C	22°C, maximum

The manufacturer shall provide a copy of the Certificate of Analysis (COA) for the polymer used in the seal coat; and the Contractor shall include the COA with the emulsified asphalt COA when submitting to the APM.

608-2.5 Seal Coat with Aggregate. Friction test data in accordance with AC 150/5320-12, at 40 or 60 mph wet, must include as a minimum; the friction value prior to sealant application; two values, between 24 and 96 hours after application, with a minimum of 24 hours between tests; and one value between 180 days and 360 days after the application. The results of the tests between 24 and 96 hours shall indicate friction is increasing at a rate to obtain similar friction value of the pavement surface prior to application, and the long-term test shall indicate no apparent adverse effect with time relative to friction values and existing pavement surface.

Seal coat material submittal without required friction performance will not be approved. Friction tests performed on this project cannot be used as a substitute for this requirement.

33.3 COMPOSITION AND APPLICATION RATE

608-3.1 Application Rate. The approximate amounts of materials per square yard (square meter) for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified dilution rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be recommended by the manufacturer's representative and approved by the APM from the test area/sections evaluation.

Application Rate

Dilution Rate	Quantity of Emulsion gal/yd ²	Quantity of Aggregate
1:1	0.10-0.17	0.20-0.50
2:1	0.08-0.17	0.20-0.50

608-3.2 Control areas and control strips. Prior to full application, the control strip must be accepted by the APM. The surface preparation, personnel, equipment, and method of operation used on the test area(s) and control strip(s) shall be the same as used on the remainder of the work.

A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the appropriate application rate of both emulsion and aggregate to be approved by the APM.

A test area(s) and control strip(s) shall be applied for each differing asphalt pavement surface identified in the project. The test area(s) and control strip(s) shall be used to determine the material application rate(s) of both emulsion and sand prior to full production.

a. For taxiway, taxilane and apron surfaces. Prior to full application, the Contractor shall place test areas at varying application rates as recommended by the Contractor's manufacturer's representative to determine appropriate application rate(s). The test areas will be located on representative section(s) of the pavement to receive the asphalt surface treatment designated by the APM.

b. For runway and high-speed exit taxiway surfaces. Prior to full application, the Contractor shall place a series of control strips a minimum of 300 feet long by 12 feet wide, or width of anticipated application, whichever is greater, at varying application rates as recommended by the manufacturer's representative and acceptable to the APM to determine appropriate application rate(s). The control strips should be separated by a minimum of 200 feet between control strips. The area to be tested will be located on a representative section of the pavement to receive the asphalt surface treatment designated by the APM. The control strips should be placed under similar field conditions as anticipated for the actual application. The skid resistance of the existing pavement shall be determined for each control strip with a continuous friction measuring equipment (CFME). The skid resistance of existing pavement can be immediately adjacent to the control strip or at the same location as the control strip if testing prior to application. The Contractor may begin testing the skid resistance of runway and high-speed exit taxiway control strips after application of the asphalt surface treatment has fully cured, generally 8 to 36 hours after application of the control strips depending on site and environmental conditions. Aircraft shall not be permitted on the runway or high-speed exit taxiway control strips until such time as the Contractor validates that its surface friction meets the maintenance planning friction levels in AC 150/5320-12, Table 3-2 when tested at speeds of 40 and 60 mph wet with approved CFME.

If the control strip should prove to be unsatisfactory, necessary adjustments to the application rate, placement operations, and equipment shall be made. Additional control strips shall be placed and additional skid resistance tests performed and evaluated. Full production shall not begin without the APM's approval of an appropriate application rate(s). Acceptable control strips shall be paid for in accordance with paragraph 608-8.1.

33.4 CONSTRUCTION METHODS

608-4.1 Worker safety. The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt emulsion product and sand and require workmen to follow the manufacturer's recommended safety precautions.

608-4.2 Weather limitations. The asphalt emulsion shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied in strong winds that interfere with the uniform application of the material(s), or when dust or sand is blowing or when rain is anticipated within eight (8) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be at, or above 60°F (16°C) and rising. Seal coat shall not be applied when pavement temperatures are expected to exceed 130°F within the subsequent 72 hours if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should emulsion get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the APM, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

608-4.3 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

a. Pressure distributor. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour or seven hundred (700) feet per minute. The equipment will be tested under pressure for leaks and to ensure proper set-up before use. The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a 12-foot, minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard. These rates shall be computer-controlled rather than mechanical. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy.

The distributor truck shall effectively heat and mix the material to the required temperature prior to application in accordance with the manufacturer's recommendations.

The distributor shall be equipped with a hand sprayer to spray the emulsion in areas not accessible to the distributor truck.

b. Aggregate spreader. The asphalt distributor truck will be equipped with an aggregate spreader mounted to the distributor truck that can apply sand to the emulsion in a single pass operation without driving through wet emulsion. The aggregate spreader shall be equipped with a variable control system

capable of uniformly distributing the sand at the specified rate at varying application widths and speeds. The aggregate spreader must be adjusted to produce an even and accurate application of specified aggregate. Prior to any seal coat application, the aggregate spreader will be calibrated onsite to ensure acceptable uniformity of spread. The APM will observe the calibration and verify the results. The aggregate spreader will be re-calibrated each time the aggregate rate is changed either during the application of test strips or production. The Contractor may consult the seal coat manufacturer representative for procedure and guidance. The sander shall have a minimum hopper capacity of 3,000 pounds of sand. Push-type hand sanders will be allowed for use around lights, signs and other obstructions, if necessary.

c. Power broom/blower. A power broom and/or blower shall be provided for removing loose material from the surface to be treated.

d. Equipment calibration. Asphalt distributors must be calibrated within the same construction season in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the APM.

608-4.4 Preparation of asphalt pavement surfaces. Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and then treat these areas with a spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

a. New asphalt pavement surfaces. Not used

608-4.5 Emulsion mixing. The application emulsion shall be obtained by blending asphalt material concentrate, water and polymer, if specified. Always add heated water to the asphalt material concentrate, never add asphalt material concentrate to heated water. Mix one part heated water to two parts asphalt material concentrate, by volume.

Add 1% polymer, by volume, to the emulsion mix. If the polymer is added to the emulsion mix at the plant, submit weight scale tickets to the APM. As an option, the polymer may be added to the emulsion mix at the job site provided the polymer is added slowly while the asphalt distributor truck circulating pump is running. The mix must be agitated for a minimum of 15 minutes or until the polymer is mixed to the satisfaction of the APM.

608-4.6 Application of asphalt emulsion. The asphalt emulsion shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the APM from the test area/sections evaluation for each designated treatment area. The asphalt emulsion should be applied at a temperature between 130°F (54°C) and 160°F (70°C) or in accordance with the manufacturer's recommendation.

If low spots and depressions greater than 1/2 inch (12 mm) in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee until the pavement surface is free of any pools of excess material.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred.

608-4.7 Application of aggregate material. Immediately following the application of the asphalt emulsion, friction sand at the rate recommended by the manufacturer's representative and approved by the APM from the test area/sections evaluation for each designated application area, shall be spread uniformly over the asphalt

emulsion in a single-pass operation simultaneous with the sealer application. The aggregate shall be spread to the same width of application as the asphalt material and shall not be applied in such thickness as to cause blanketing.

Sprinkling of additional aggregate material, and spraying additional asphalt material over areas that show up having insufficient cover or bitumen, shall be done by hand whenever necessary. In areas where hand work is necessitated, the sand shall be applied before the sealant begins to break.

Minimize aggregate from being broadcast and accumulating on the untreated pavement adjacent to an application pass. Prior to the next application pass, the Contractor shall clean areas of excess or loose aggregate and remove from project site.

33.5 QUALITY CONTROL (QC)

608-5.1 Manufacturer's representation. The manufacturer's representative knowledgeable of the material, procedures, and equipment described in the specification is responsible to assist the Contractor and APM in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application. Documentation of the manufacturer representative's experience and knowledge for applying the seal coat product shall be furnished to the APM a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the Contractor's bid price.

608-5.2 Contractor qualifications. The Contractor shall provide documentation to the APM that the seal coat Contractor is qualified to apply the seal coat, including personnel, and equipment, and has made at least three (3) applications similar to this project in the past two (2) years.

33.6 MATERIAL ACCEPTANCE

608-6.1 Application rate. The rate of application of the asphalt emulsion shall be verified at least twice per day.

608-6.2 Friction tests. Friction tests **will be performed by Hollywood Burbank Airport** in accordance with AC 150/5320-12, Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces, shall be performed on all runway and high-speed taxiways that received a seal coat. Each test includes performing friction tests at 40 mph and 60 mph both wet, 15 feet to each side of runway centerline with approved continuous friction measuring equipment (CFME). The Contractor shall coordinate testing with the APM and provide the APM a written report of friction test results. The APM shall be present for testing.

33.7 METHOD OF MEASUREMENT

608-7.1 Asphalt surface treatment. The quantity of asphalt surface treatment shall be measured by the square yards of material applied in accordance with the plans and specifications and accepted by the APM.

The Contractor must furnish the APM with the certified weigh bills when materials are received for the asphalt material used under this contract. The Contractor must not remove material from the tank car or storage tank until initial amounts and temperature measurements have been verified.

33.8 BASIS OF PAYMENT

608-8.1 Payment shall be made at the contract unit price per square yard for the asphalt surface treatment applied and accepted by the APM. This price shall be full compensation for all surface preparation, furnishing all materials, delivery and application of these materials, for all labor, equipment, tools, and incidentals necessary to complete the item, and any costs associated with furnishing a qualified manufacturer's representative to assist with control strips.

Payment will be made under:

Item 60:	Asphalt Surface Treatment (One-to-One Dilution Emulsion), per square yard
Item 61:	Asphalt Surface Treatment (Two-to-One Dilution Emulsion), per square yard

33.9 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1602 Cement Concrete	Standard Specification for Mixing Water Used in the Production of Hydraulic
ASTM D5	Standard Test Method for Penetration of Asphalt Materials
ASTM D244	Standard Test Methods and Practices for Emulsified Asphalts
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys Advisory Circulars (AC)
AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements

END OF ITEM P-608

34 ITEM P-608-R RAPID CURE SEAL COAT

34.1 DESCRIPTION

608-R-1.1 This item shall consist of the application of an asphalt surface treatment composed of natural and refined asphalt materials, additives, and light oils, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including aprons, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the plans or as directed by the APM.

The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term asphalt means natural and refined asphalt materials in this specification.

34.2 MATERIALS

608-R-2.1 Aggregate. The fine-aggregate material shall be a dry, clean, sound, durable, angular shaped, with highly textured surfaces, manufactured specialty abrasive aggregate. It shall have 100% fractured faces, SiO₂ content of 55% minimum, CaO of 3% max, with a sand equivalent greater than 85 and a Mohs hardness of 7 or greater. Additional characteristics as outlined in the following table(s). The Contractor shall submit specialty aggregate manufacturer's technical data and the specialty aggregate manufacturer's certification indicating that the specialty aggregate meets the requirements of the specification to the APM prior to start of construction. The aggregate must be approved for use by the APM and shall meet the following gradation limits when tested in accordance with ASTM C136:

Aggregate Material Gradation Requirements:

Sieve Designation	Percentage by Weight Passing Sieves
No. 8	100
No. 14	98-100
No. 16	85-100
No. 30	15-45
No. 50	0-8
No. 70	0-2

Aggregate Characteristics

Test	Standard	Range
Micro-Deval	ASTM D7428	15% max
Magnesium Sulfate Soundness	ASTM C88	2% max
Aggregate Angularity	ASTM C1252 – Test Method A	45% min
Moisture Content (%)	ASTM C566	2% max
Bulk Dry Specific Gravity	ASTM C128	2.6 – 3.0
Absorption (%)	ASTM D2216	3% max
Mohs Hardness	Mohs Scale	7 min

The Contractor shall provide a certification of analysis (COA) showing analysis and properties of the material delivered for use on the project. The Contractor's certification may be subject to verification by testing the material delivered for use on the project.

608-R-2.2 Asphalt material. The asphalt material base residue shall contain not less than 40% gilsonite, or uintaite, and shall not contain any tall oil pitch or coal tar material. The material shall be compatible with asphalt pavement, and have a 5-year minimum proven aviation performance record at airports with similar climatic conditions. The solvent-based rapid cure material shall meet the following properties:

Properties for Asphalt Sealing Material

Properties	Specification	Limits
Kinematic Viscosity at 140°F (60°C)	ASTM D4402	10-30 cSt
Percent Residue by Distillation	ASTM D402	30-45%

Tests on Residue from Distillation

Properties	Specification	Limits
Penetration at 77°F (25°C)	ASTM D5	2-12 dmm
Softening Point	ASTM D36	180-200
Solubility in 1,1,1 Trichloroethylene	ASTM D2042	99% min.
HCl Precipitation Value		18-25

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt sealer delivered to the project. If the asphalt sealer is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt sealer properties. The COA shall be provided to and approved by the APM before the asphalt material is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be inferred as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

The asphalt sealing material must be applied in an undiluted form. The material may be stored at ambient temperature for long periods of time if necessary. Storage will follow industry standard recommendations due to the flammability of the material; avoid sparks and open flames to come into contact with the material or any gasses that might be escaping the storage vessel.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

608-R-2.3 Seal Coat with Aggregate. The Contractor shall submit friction test data from at least two (2) airport projects identified under 608-R-2.2. The test data must be from the same project and include technical details on application rates, aggregate rates, and point of contact at the airport to confirm use and success of sealer with aggregate.

Friction test data in accordance with AC 150/5320-12, at 40 or 60 mph wet, must include as a minimum; the friction value prior to sealant application; two values, between 24 and 96 hours after application, with a minimum of 24 hours between tests; and one value between 180 days and 360 days after the application. The results of the tests between 24 and 96 hours shall indicate friction is increasing at a rate to obtain similar friction value of the pavement surface prior to application, and the long-term test shall indicate no apparent adverse effect with time relative to friction values and existing pavement surface.

Seal coat material submittal without required friction performance will not be approved. Friction tests performed on this project cannot be used as a substitute of this requirement.

34.3 COMPOSITION AND APPLICATION RATE

608-R-3.1 Application Rate. The approximate amounts of materials per square yard (square meter) for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be

recommended by the manufacturer's representative for control strip evaluations, and approved by the APM from the test area/sections evaluation.

Application Rate

Dilution Rate	Quantity of Sealer gal/yd ²	Quantity of Aggregate lb/yd ²
N/A	0.08-0.15	0.40-0.50

608-R-3.2 Control areas and control strips. A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the appropriate application rate of both sealer and aggregate to be evaluated and approved by the APM. The manufacturer's rep shall provide and submit to APM a certified letter indicating their evaluation for satisfactory performance of the control strip, and recommendation to allow for full-production.

A test area and/or section shall be applied for each differing asphalt pavement surface identified in the project. The control area(s) and/or control strip(s) shall be used to determine the material application rate(s) of both sealer and aggregate prior to full production. The same equipment and method of operation shall be utilized on the control area(s) and/or control strip(s) as will be utilized on the remainder of the work.

a. For taxiway, taxilane and apron surfaces. Prior to full application, the Contractor shall place test areas at varying application rates as recommended by the Contractor's manufacturer's representative to determine appropriate application rate(s). The test areas will be located on representative section(s) of the pavement to receive the asphalt surface treatment designated by the APM.

b. For runway and high-speed exit taxiway surfaces. Prior to full application, the Contractor shall place a series of control strips a minimum of 300 feet long by 12 feet wide, or width of anticipated application, whichever is greater, at varying application rates as recommended by the manufacturer's representative and acceptable to the APM to determine appropriate application rate(s). The control strips should be separated by a minimum of 200 feet between control strips. The area to be tested will be located on a representative section of the pavement to receive the asphalt surface treatment designated by the APM. The control strips should be placed under similar field conditions as anticipated for the actual application. Before beginning the control strip(s), the skid resistance of the existing pavement shall be determined for each control strip with a continuous friction measuring equipment (CFME). The skid resistance of existing pavement can be immediately adjacent to the control strip or at the same location as the control strip if testing prior to application.

The Contractor may begin testing the skid resistance of runway and high-speed exit taxiway control strips after application of the asphalt surface treatment has fully cured, generally 2 to 4 hours after application of the control strips depending on site conditions. Aircraft shall not be permitted on the runway or high-speed exit taxiway control strips until such time as the Contractor validates that its surface friction meets the maintenance planning

friction levels in AC 150/5320-12, Table 3-2 when tested at speeds of 40 and 60 mph (65 and 95 km/h) wet with approved CFME.

c. Control strip. If the control strip should prove to be unsatisfactory, necessary adjustments to the application rate, placement operations, and equipment shall be made. Additional control strips shall be placed and additional skid resistance tests performed and evaluated. Full production shall not begin without the APM's approval of an appropriate application rate(s). Acceptable control strips shall be paid for in accordance with paragraph 608-R-8.1.

34.4 CONSTRUCTION METHODS

608-R-4.1 Worker safety. The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt sealer product and aggregate and require workmen to follow the manufacturer's recommended safety precautions. All additional industry standard safety precautions regarding the storage and applications of solvent based asphalts should be understood and followed by the Contractor.

608-R-4.2 Weather limitations. The asphalt sealer shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied when dust or aggregate is blowing or when rain is anticipated within four (4) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be at, or above 55°F (14°C) and rising. The sealer will shall not be applied when pavement temperatures are expected to exceed 160F within the subsequent 72 hours if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the sealer. Should sealer get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the APM, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

608-R-4.3 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

a. Pressure distributor. The sealer shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the sealer. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour or seven hundred (700) feet per minute. The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use. The distributor truck shall be equipped with a 12-foot, minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard. These rates shall be computer-controlled rather than mechanical. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the sealer, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy.

The distributor truck shall effectively mix the material prior to application.

The distributor shall be equipped with a hand sprayer to spray the sealer in areas not accessible to the distributor truck.

b. Aggregate spreader. The asphalt distributor truck will be equipped with an aggregate spreader mounted to the distributor truck that can apply aggregate to the sealer in a single pass operation without driving through wet sealer. The aggregate spreader shall be equipped with a variable control system capable of uniformly distributing the aggregate at the specified rate at varying application widths and speeds. The aggregate spreader must be adjusted to produce an even and accurate application of specified aggregate. Prior to any seal coat application, the aggregate spreader will be calibrated onsite to ensure acceptable uniformity of spread. The APM will observe the calibration and verify the results. The aggregate spreader will be re-calibrated each time the aggregate rate is changed either during the application of test strips or production. The Contractor may consult the seal coat manufacturer representative for procedure and guidance. The aggregate spreader shall have a minimum hopper capacity of 3,000 pounds of aggregate. Push-type hand spreaders will be allowed for use around lights, signs and other obstructions, if necessary.

c. Power broom/blower. A power broom and/or blower shall be provided for removing loose material from the surface to be treated.

d. Equipment calibration. Asphalt distributors must be calibrated within the same construction season in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the APM.

608-R-4.4 Preparation of asphalt pavement surfaces. Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and treating these areas with the oil spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

a. New asphalt pavement surfaces. Not used.

608-R-4.5 Application of asphalt sealer. The asphalt sealer shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the APM from the test area/sections evaluation for each designated treatment area. Recommended material temperature for application is 70°F to 90°F, but depending on the application equipment used, good material dispersion and pavement coverage may be achieved at lower material temperatures. The material should not be heated above 100°F.

Pavement surfaces which have excessive runoff of seal coat due to excessive amount of material being applied or excessive surface grade shall be treated in two or more applications, if feasible, to the specified application rate at no additional cost to the Owner. Each additional application shall be performed after the prior application of material has penetrated into the pavement.

If low spots and depressions greater than 1/2 inch (12 mm) in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee. Brooming shall continue until the pavement surface is free of any pools of excess material. Ponding and/or puddling shall not cause excessive pavement tackiness and/or additional distress.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred. Asphalt materials shall not be discharged into borrow pits or gutters or on the airport area.

Caution. *Heating asphalt binders of any kind always constitutes some degree of hazard. The most hazardous of these are cutback asphalts because of the highly volatile solvents used. Care must be taken not to allow any*

spark or open flame to come in contact with the cutback asphalt or the gases from cutback asphalt due to the low flash point. It is the Contractor's responsibility to understand and adhere to these standards in regards to staying within the recommended application temperatures of this material and at all times during production.

608-R-4.6 Application of aggregate material. Immediately following the application of the asphalt sealer, aggregate at the rate recommended by the manufacturer's representative and approved by the APM from the test area/sections evaluation for each designated application area, shall be spread uniformly over the asphalt sealer in a single-pass operation simultaneous with the sealer application. The sealer material and aggregate shall be applied simultaneously in a single pass operation, so as to not drive through the applied fresh sealer. The aggregate shall be spread to the same width of application as the asphalt material and shall not be applied in such thickness as to cause blanketing.

Sprinkling of additional aggregate material, and spraying additional asphalt material over areas that show up having insufficient cover or bitumen, shall be done by hand whenever necessary. In areas where hand work is necessitated, the aggregate shall be applied before the sealant begins to break.

Minimize aggregate from being broadcast and accumulating on the untreated pavement adjacent to an application pass. Prior to the next application pass, the Contractor shall clean areas of excess or loose aggregate and remove from project site.

34.5 QUALITY CONTROL (QC)

608-R-5.1 Manufacturer's representation. The manufacturer's representative knowledgeable of the material, procedures, and equipment described in the specification is responsible for assisting the Contractor and APM in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application. Documentation of the manufacturer representative's experience and knowledge for applying the seal coat product shall be furnished to the APM a minimum of 10 workdays prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the Contractor's bid price.

608-R-5.2 Contractor qualifications. The Contractor shall provide the APM with the seal coat Contractor's qualifications for applicators, personnel and equipment. The Contractor shall also provide documentation that the seal coat Contractor is qualified to apply the seal coat and has made at least three (3) applications similar to this project in the past two (2) years.

34.6 MATERIAL ACCEPTANCE

608-R-6.1 Application rate. The rate of application of the asphalt emulsion shall be verified at least twice per day.

608-R-6.2 Friction tests. Friction tests **will be provided by the APM** in accordance with AC 150/5320-12, Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces, and will be accomplished on all runway and high-speed taxiways that have received a seal coat. Each test will include performing friction tests at 40 mph and 60 mph both wet, 15 feet to each side of runway centerline.

34.7 METHOD OF MEASUREMENT

608-R-7.1 Asphalt surface treatment. The quantity of asphalt surface treatment shall be measured by the square yards of material applied in accordance with the plans and specifications and accepted by the APM.

The Contractor must furnish the APM with the certified weight bills when materials are received for the asphalt material used under this contract. The Contractor must not remove material from the tank car or storage tank until initial amounts and temperature measurements have been verified.

34.8 BASIS OF PAYMENT

608-R-8.1 Payment shall be made at the contract unit price per square yard for the asphalt surface treatment applied and accepted by the APM. This price shall be full compensation for all surface preparation, furnishing all materials, delivery and application of these materials, for all labor, equipment, tools, and incidentals necessary to complete the item, and any costs associated with furnishing a qualified manufacturer's representative to assist with control strips.

Payment will be made under:

Item 62:	Asphalt Surface Treatment (rapid cure seal coat)– per square yard

34.9 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C128	Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM C1252	Standard Test Methods for Uncompacted Void Content of Fine Aggregate
ASTM D5	Standard Test Method for Penetration of Asphalt Materials
ASTM D36	Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
ASTM D402	Standard Test Method for Distillation of Cutback Asphalt
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2216	Standard Test Methods for Laboratory Determination of Water (Moisture)

Content of Soil and Rock by Mass

ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys
ASTM D6433	Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys
ASTM D6997	Standard Test Method for Distillation of Emulsified Asphalt
ASTM D7428	Standard Test Method for Resistance of Fine Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements
AC 150/5380-7	Airport Pavement Management Program (PMP)

END OF ITEM P-608-R

35 ITEM P-610 CONCRETE FOR MISCELLANEOUS STRUCTURES

35.1 DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

610-1.2 Submittals. Prior to commencing Work in this item and delivery of materials to the job site, the Contractor shall submit the following:

- a. Test Results: The Contractor shall submit all copies of certified test results on aggregates, cement, flyash, admixtures, joint material, steel reinforcement and curing material to the APM for review. These shall include retests for items that failed initial testing.
- b. The contractor shall submit, to the APM, a concrete mix design including the proportions and source of materials, admixtures, and compressive strength.

35.2 MATERIALS

610-2.1 General. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the APM before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. Reactivity. Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the APM. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 Coarse aggregate. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
3/4 inch (19 mm)	67
1/2 inch (12.5 mm)	7

610-2.2.1 Coarse aggregate susceptibility to durability (D) cracking.

Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

610-2.3 Fine aggregate. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 Cement. Cement shall conform to the requirements of ASTM C150 Type II or V (depending on the site conditions as evaluated by the APM).

610-2.4.1 Cement for High Early Strength (HES) Concrete. Portland Cement conforming to requirements of ASTM C150-Type III (depending on the site conditions as evaluated by the APM) may be used when high early strength concrete of the required strength is required for opening the area for traffic per construction phasing schedules.

610-2.5 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the APM.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 Admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the APM may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the APM from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. Other chemical admixtures. The use of set retarding and set-accelerating admixtures shall be approved by the APM. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 Premolded joint material. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751.

610-2.9 Joint filler. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 Steel reinforcement. Reinforcing shall be as indicated on the plans and conforming to the requirements of the following:

Steel Reinforcement

Reinforcing Steel	ASTM A615, ASTM A706, ASTM A775, ASTM A934
Welded Steel Wire Fabric	ASTM A1064, ASTM A884
Welded Deformed Steel Fabric	ASTM A1064
Bar Mats	ASTM A184 or ASTM A704

610-2.11 Materials for curing concrete. Curing materials shall conform to White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B ASTM C309.

35.3 CONSTRUCTION METHODS

610-3.1 General. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the APM.

610-3.2 Concrete Mixture. Unless otherwise indicated on the plans and these specifications, the concrete shall develop a compressive strength of **4,000** psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard. The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

Unless otherwise specified on the phasing plans, for locations in which High Early Strength concrete is required, the concrete shall achieve a minimum compressive strength of **3,250** psi prior to opening of the area to aircraft traffic and a minimum compressive strength of **4,000** psi in 28 days as specified above.

610-3.3 Mixing. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the APMs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at their expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 Forms. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the APM. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 Placing reinforcement. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 Embedded items. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

610-3.7 Concrete Consistency. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 Placing concrete. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework,

and the placing of the steel reinforcing have been approved by the APM. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 Vibration. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 Joints. Joints shall be constructed as indicated on the plans.

610-3.11 Finishing. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 Curing and protection. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 Cold weather placing. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 Hot weather placing. When concrete is placed in hot weather greater than 85°F (30 °C), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

35.4 QUALITY ASSURANCE (QA)

610-4.1 Quality Assurance sampling and testing. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The APM will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 Defective work. Any defective work that cannot be satisfactorily repaired as determined by the APM, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, not achieving the minimum specified strength at 28-days using the procedures of ASTM C31 and ASTM C39, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete. No other methods for determining the strength of the concrete will be used unless otherwise directed by the APM.

35.5 METHOD OF MEASUREMENT

610-5.1 Concrete for miscellaneous structures shall be measured by the number of cubic yards, unless otherwise bid items are provided separately that include concrete, based on batch tickets of material of concrete complete in place and accepted.

610-5.2 High early strength Concrete for miscellaneous structures shall be measured by the number of cubic yards, unless otherwise bid items are provided separately that include concrete, based on batch tickets of material of concrete complete in place and accepted.

610-5.3 Reinforcing steel used in concrete for miscellaneous structures shall be measured by the number of pounds, unless otherwise bid items are provided separately that include reinforcing steel, complete in place and accepted.

35.6 BASIS OF PAYMENT

610-6.1 Payment shall be made at the contract price by the number of cubic yards of concrete based on batch tickets of material. This price shall be full compensation for furnishing all materials and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

610-6.2 Payment shall be made at the contract price by the number of cubic yards of high early strength concrete based on batch tickets of material. This price shall be full compensation for furnishing all materials and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

610-6.3 Payment shall be made at the contract price by the number of pounds of reinforcing steel used in the concrete for miscellaneous structures. This price shall be full compensation for furnishing all materials and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 63: Concrete for Miscellaneous Structures, per cubic yard

Item 64: High Early Strength Concrete for Miscellaneous Structures,
per cubic yard

Item 65: Reinforcing Steel, per pound

35.7 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement

ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
American Concrete Institute (ACI)	
ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610

36 ITEM P-621 SAW-CUT GROOVES

36.1 DESCRIPTION

621-1.1 This item consists of constructing saw-cut grooves to minimize hydroplaning during wet weather, providing a skid resistant surface in accordance with these specifications and at the locations shown on the plans, or as directed by the APM.

36.2 CONSTRUCTION METHODS

621-2.1 Procedures. The Contractor shall submit to the APM the grooving sequence and method of placing guide-lines to control grooving operation. Transverse grooves saw-cut in the pavement must form a 1/4 inch (+1/16 inch, -0 inch) wide by 1/4 inch ($\pm 1/16$ inch) deep by 1-1/2 inch (-1/8 inch, +0 inch) center-to-center configuration. The grooves must be continuous for the runway and high-speed taxiway length as shown on the plans. They must be saw-cut transversely (perpendicular to centerline) in the runway and high-speed taxiway pavement to not less than 10 feet from the runway and high-speed taxiway pavement edge to allow adequate space for equipment operation.

The saw-cut grooves must meet the following tolerances. The tolerances apply to each day's production and to each piece of grooving equipment used for production. The Contractor is responsible for all controls and process adjustments necessary to meet these tolerances. The Contractor shall routinely spot check for compliance each time the equipment aligns for a grooving pass.

a. Alignment tolerance. The grooves shall not vary more than $\pm 1\text{-}1/2$ inch (38 mm) in alignment for 75 feet along the runway and high-speed taxiway length, allowing for realignment every 500 feet along the runway and high-speed taxiway length.

b. Groove tolerance.

(1) Depth. The standard depth is 1/4 inch (6 mm). At least 90% of the grooves must be at least 3/16 inch (5 mm), at least 60% of the grooves must be at least 1/4 inch (6 mm), and not more than 10% of the grooves may exceed 5/16 inch (8 mm).

(2) Width. The standard width is 1/4 inch (6 mm). At least 90% of the grooves must be at least 3/16 inch (5 mm), at least 60% of the grooves must be at least 1/4 inch (6 mm), and not more than 10% of the grooves may exceed 5/16 inch (8 mm).

(3) Center-to-center spacing. The standard spacing is 1-1/2 inch (38 mm). Minimum spacing 1-3/8 inch (34 mm). Maximum spacing 1-1/2 inch (38 mm).

Saw-cut grooves must not be closer than 3 inches (8 cm) or more than 9 inches (23 cm) from transverse joints in concrete pavements. Grooves must not be closer than 6 inches (150 mm) and no more than 18 inches (0.5 m) from in-pavement light fixtures. Grooves may be continued through longitudinal construction joints. Where neoprene compression seals have been installed and the compression seals are recessed sufficiently to prevent damage from the grooving operation, grooves may be continued through the longitudinal joints. Where neoprene compression seals have been installed and the compression seals are not recessed sufficiently to prevent damage from the grooving operation, grooves must not be closer than 3 inches (8 cm) or more than 5 inches (125 mm) from the longitudinal joints. Where lighting cables are installed, grooving through longitudinal or diagonal saw kerfs shall not be allowed.

621-2.2 Environmental requirements. Grooving operations will not be permitted when freezing conditions prevent the immediate removal of debris and/or drainage of water from the grooved area. Discharge and disposal of waste slurry shall be the Contractor's responsibility.

621-2.3 Control strip. Groove a control strip in an area of the pavement outside of the trafficked area, or as shown on the plans as approved by the APM. The area shall be **50** feet long by two lanes wide. Demonstrate the setup and alignment process, the grooving operation, and the waste slurry disposal.

621-2.4 Existing pavements. Bumps, depressed areas, bad or faulted joints, and badly cracked and/or spalled areas in the pavement shall not be grooved until such areas are adequately repaired or replaced.

621-2.5 New pavements. New asphalt and Portland cement concrete pavements shall be allowed to cure for a minimum of 30 days before grooving, to allow the material to become stable enough to prevent closing of the grooves under normal use. If it can be demonstrated that grooves are stable, and can be installed with no spalling, tearing or raveling of the groove edge, grooving may occur sooner than 30 days with approval of the APM. All grade corrections must be completed prior to grooving. Spalling along or tearing or raveling of the groove edges shall not be allowed.

621-2.6 Grooving machine. Provide a grooving machine that is power driven, self-propelled, specifically designed and manufactured for pavement grooving, and has a self-contained and integrated continuous slurry vacuum system as the primary method for removing waste slurry. The grooving machine shall be equipped with diamond-saw cutting blades, and capable of making at least 18 inches (0.5 m) in width of multiple parallel grooves in one pass of the machine. Thickness of the cutting blades shall be capable of making the required width and depth of grooves in one pass of the machine. The cutting head shall not contain a mixture of new and worn blades or blades of unequal wear or diameter. Match the blade type and configuration with the hardness of the existing airfield pavement. The wheels on the grooving machine shall be of a design that will not scar or spall the pavement. Provide the machine with devices to control depth of groove and alignment.

621-2.7 Water supply. Water for the grooving operation shall be provided by the Contractor.

621-2.8 Clean-up. During and after installation of saw-cut grooves, the Contractor must remove from the pavement all debris, waste, and by-products generated by the operations to the satisfaction of the APM. Cleanup of waste material must be continuous during the grooving operation. Flush debris produced by the machine to the edge of the grooved area or pick it up as it forms. The dust coating remaining shall be picked up or flushed to the edge of the area if the resultant accumulation is not detrimental to the vegetation or storm drainage system. Accomplish all flushing operations in a manner to prevent erosion on the shoulders or damage to vegetation. Waste material must be disposed of in an approved manner. Waste material must not be allowed to enter the airport storm sewer system. The Contractor must dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

621-2.9 Repair of damaged pavement. Grooving must be stopped and damaged pavement repaired at the Contractor's expense when directed by the APM.

621-2.10 Production rate. The Contractor must furnish sufficient equipment to complete grooving of pavement within the construction phasing schedule and contract time as required.

36.3 ACCEPTANCE

621-3.1 Acceptance testing. Grooves will be accepted based on results of zone testing. All acceptance testing necessary to determine conformance with the groove tolerances specified will be performed by the APM.

Instruments for measuring groove width and depth must have a range of at least 0.5 inch (12 mm) and a resolution of at least 0.005 inch (0.13 mm). Gauge blocks or gauges machined to standard grooves width, depth, and spacing may be used.

Instruments for measuring center-to-center spacing must have a range of at least 3 inches (8 cm) and a resolution of at least 0.02 inch (0.5 mm).

The APM will measure grooves in five zones across the pavement width. Measurements will be made at least three times during each day's production. Measurements in all zones will be made for each cutting head on each piece of grooving equipment used for each day's production.

The five zones are as follows:

- Zone 1 Centerline to 5 feet (1.5 m) left or right of the centerline.
- Zone 2 5 feet (1.5 m) to 25 feet (7.5 m) left of the centerline.
- Zone 3 5 feet (1.5 m) 25 feet (7.5 m) right of the centerline.
- Zone 4 25 feet (7.5 m) to edge of grooving left of the centerline.
- Zone 5 25 feet (7.5 m) to edge of grooving right of the centerline.

At a random location within each zone, five consecutive grooves sawed by each cutting head on each piece of grooving equipment will be measured for width, depth, and spacing. The five consecutive measurements must be located about the middle blade of each cutting head ± 4 inches (100 mm). Measurements will be made along a line perpendicular to the grooves.

- Width or depth measurements less than 0.170 inch (4 mm) shall be considered less than 3/16 inch (5 mm).
- Width or depth measurements more than 0.330 inch (8 mm) shall be considered more than 5/16 inch (8 mm).
- Width or depth measurements more than 0.235 inch (6 mm) shall be considered more than 1/4 inch (6 mm).

Production must be adjusted when more than one groove on a cutting head fails to meet the standard depth, width, or spacing in more than one zone.

36.4 METHOD OF MEASUREMENT

621-4.1 The quantity of grooving to be paid for shall be the number of square yards (square meters) of grooving performed in accordance with the specifications and accepted by the APM per paragraph 621-3.1.

36.5 BASIS OF PAYMENT

621-5.1 Payment for saw-cut grooving. Payment for saw-cut grooving will be made at the contract unit price per square yard for saw-cut grooving. This price shall be full compensation for furnishing all materials, and for all preparation, delivering, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 66: Saw-Cut Grooving, per square yard

36.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-621

37 ITEM P-626 EMULSIFIED ASPHALT SLURRY SEAL SURFACE TREATMENT

37.1 DESCRIPTION

626-1.1 This item shall consist of a mixture of emulsified asphalt, polymer, mineral aggregate, and water properly proportioned, mixed, and spread on an asphalt pavement surface, including airport pavements serving [small airplanes 12,500 lbs or less, roads, and other general applications. The application of the surface treatment shall be in accordance with these specifications and shall conform to the dimensions shown on the plans or as directed by the APM.

37.2 MATERIALS

626-2.1 Aggregate. The aggregate shall consist of sound and durable manufactured sand, slag, crusher fines, crushed stone, or a combination. The aggregate shall be clean and free from vegetable matter, dirt, and other deleterious substances. The aggregate shall have a sand equivalent of not less than 45 percent when tested in accordance with ASTM D2419. The aggregate shall show a loss of not more than 35 percent when tested in accordance with ASTM C131. The sodium sulfate soundness loss shall not exceed 12 percent, or the magnesium soundness loss shall not exceed 20 percent after 5 cycles when tested in accordance with ASTM C88. Aggregate shall be 100% crushed.

The combined aggregate shall conform to the gradation shown in Table 1 when tested in accordance with ASTM C136 and ASTM C117.

Table 1. Gradation of Aggregates*

Sieve Size	Percent by Weight Passing Sieve			
	Type I	Type II	Type III	Type IA
3/8 inch (9.5 mm)	100	100	100	100
No. 4 (4.75 mm)	100	90 - 100	70 - 90	98 - 100
No. 8 (2.36 mm)	90 - 100	65 - 90	45 - 70	85 - 95
No. 16 (1.18 mm)	65 - 90	45 - 70	28 - 50	50 - 75
No. 30 (600 µm)	40 - 65	30 - 50	19 - 34	30 - 50
No. 50 (300 µm)	25 - 42	18 - 30	12 - 25	18 - 35
No. 100 (150 µm)	15 - 30	10 - 21	7 - 18	10 - 21
No. 200 (75 µm)	10 - 20	5 - 15	5 - 15	5 - 10
Residual asphalt content percent dry weight of aggregate	10% - 16%	7.5% - 13.5%	6.5% - 12%	9% - 13.5%

*Table 1 – Gradation of Aggregates shall be as specified in the bid schedule or the plans.

The job mix formula (mix design) shall be run using aggregate within the gradation band for the desired type shown in Table 1. Once the mix design has been submitted and approved by the APM, the aggregate used on the project shall not vary by more than the tolerances shown in Table 2. At no time shall the aggregate used go out of the gradation band in Table 1.

The aggregate will be accepted at the job location or stockpile based on five gradation test samples in accordance with ASTM D75. If the average of the five tests is within the gradation tolerances, then the materials will be accepted. If the tests show the material to be out of tolerance, the Contractor will be given the choice either to remove the material or blend other aggregates with the stockpile material to bring it into specification. Materials used in blending shall meet the quality tests before blending and shall be blended in a manner to produce a consistent gradation. This blending may require a new mix design.

Screening shall be required at the project stockpile site if there are oversize materials in the mix.

Precautions shall be taken to prevent segregation of the aggregate in storing and handling. The stockpile shall be kept in areas that drain readily.

a. Aggregate Tolerance. Once the mix design has been accepted, the aggregate gradation used on the project may vary from the aggregate gradation used in the mix design on each sieve by the percentages shown in Table 2. If the project aggregate fails to remain within this tolerance, a new mix design will be required by the APM at the expense of the Contractor.

Table 2. Aggregate Tolerance

Sieve Size	Tolerance, percent by weight passing sieve
3/8 inch (9.5 mm)	
No. 4 (4.75 mm)	±5%
No. 8 (2.36 mm)	±5%
No. 16 (1.18 mm)	±5%
No. (600 µm)	±5%
No. 50 (300 µm)	±4%
No. 100 (150 µm)	±3%
No. 200 (75 µm)	±2%
Residual Asphalt, percent dry weight of aggregate	±1%

626-2.2 Mineral filler. If mineral filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242 and shall be used in the amounts required by the mix design. The mineral filler shall be considered as part of the aggregate.

626-2.3 Emulsified asphalt. The emulsified asphalt shall conform to the requirements of ASTM D3628. The cement mixing test is waived for these slurry type emulsions. The type of emulsified asphalt shall be either anionic or cationic, whichever is best suited to the aggregate and job conditions to be encountered.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the APM before the emulsified asphalt is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

626-2.4 Polymer. The Contractor shall submit manufacturer's technical data, the manufacturer's certification indicating that the polymer meets the requirements of the specification, and the asphalt material manufacturer's approval of its use to the APM.

626-2.5 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

37.3 COMPOSITION AND APPLICATION

626-3.1 Composition. The slurry seal shall consist of a mixture of emulsified asphalt, mineral aggregate, a minimum of 1% polymer, additives as necessary, and water.

626-3.2 Job mix formula. The mix design shall be developed by a laboratory with experience in designing slurry seal mixes and a signed copy shall be submitted in writing by the Contractor to the APM at least 10 days prior to the start of operations. No slurry seal for payment shall be placed until a mix design has been approved by the APM.

The laboratory report (mix design) shall indicate the proportions of aggregates, mineral filler (minimum and maximum), water (minimum and maximum), polymer (%), and asphalt emulsion based on the dry aggregate weight. It shall also report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effects). The mix design shall be in effect until modified in writing by the APM. If the sources of materials change, a new mix design shall be established before the new material is used.

The Contractor shall submit to the APM for approval a complete mix design on the materials proposed for use, prepared and certified by an approved laboratory. Compatibility of the aggregate, emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate and grade of emulsified asphalt that the Contractor will provide on the project. At a minimum, the required tests and values needed are as follows:

Slurry Mix Tests

ISSA Technical Bulletin No.	Description	Specification
ISSA TB-100	Wet track abrasion loss one hour soak	50 g/ft ² Max (538 g/m ²)
ISSA TB-115	Determination of Slurry System Compatibility	Pass

626-3.3 Application rate. Unless otherwise specified, the slurry seal shall be applied at the application rates shown in Table 3.

Table 3. Slurry Application Rates

Mix Measurement	Type I	Type II	Type III	Type IA
Pounds of mixture per square yard	8 - 12	12 - 20	18 - 30	10 - 16
Kilograms of mixture per square meter	4.3 - 6.5	6.5 - 10.9	9.8 - 16.3	5.4 - 8.6

The rate of application shall not vary more than ± 2 pounds per square yard (± 1.1 kg per square meter).

626-3.4 Control strips. Control strips shall be placed prior to the start of the slurry seal work in the presence of the APM. The test area will be located on the existing pavement and designated by the APM. Control strips shall be made by each machine after calibration. Separate control strips by a minimum of 200 feet between sections. Samples of the slurry seal may be taken and the mix consistency verified by using ISSA TB-106 Measurement of Slurry Seal Consistency test. In addition, the proportions of the individual.

A qualified slurry seal Contractor's representative shall be present in the field to assist the Contractor in applying test areas and/or control strips to determine the optimum application rate of both emulsion and aggregate.

37.4 CONSTRUCTION METHODS

626-4.1 Weather limitations. The slurry seal shall not be applied if either the pavement or air temperature is below 50°F (10°C) and falling but may be applied when both pavement and air temperature are above 45°F (7°C) and rising. No slurry seal shall be applied when there the finished product will freeze before 24 hours. Do not apply slurry seal during rain or other adverse weather conditions. The mixture shall not be applied when weather conditions prolong opening to traffic beyond a reasonable time.

626-4.2 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of this work.

a. Slurry mixing equipment. The machine shall be specifically designed and manufactured to lay slurry seal. The material shall be mixed by a self-propelled slurry seal mixing machine of either truck mounted or continuous run design. Either type machine shall be able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, and water to a revolving mixer and discharge the mixed product on a continuous flow basis. The machine shall have sufficient storage capacity for materials to maintain an adequate supply to the proportioning controls.

If continuous run equipment is used, the machine shall be equipped to allow the operator full control of the forward and reverse speed of the machine during application of the slurry seal, with a self-loading device, with opposite side driver stations, all part of original equipment manufacturer design.

The aggregate shall be pre-wetted immediately prior to mixing with the emulsion. The mixing unit of the mixing chamber shall be capable of thoroughly blending all ingredients. No excessive mixing shall be permitted. The mixing machine shall be equipped with a fines feeder that provides an accurate metering device or method to introduce a predetermined proportion of mineral filler into the mixer at the same time and location that the aggregate is fed into the mixer.

The mixing machine shall be equipped with a water pressure system and fog-type spray bar adequate for complete fogging of the surface with an application of 0.05 to 0.10 gallon per square yard (0.23 to 0.45 liter per square meter) preceding the spreading equipment.

Sufficient machine storage capacity to mix properly and apply a minimum of 5 tons of the slurry shall be provided. Proportioning devices shall be calibrated prior to placing the slurry seal.

b. Slurry spreading equipment. The mixture shall be spread uniformly by means of a conventional surfacing spreader box attached to the mixer and equipped to agitate and spread the material evenly throughout the box. A front seal shall be provided to ensure no loss of the mixture at the surface contact point. The rear seal shall act as the final strike-off and shall be adjustable. The spreader box and rear strike-off shall be designed and operated to produce a free flow of material of uniform consistency to the rear strike-off. The spreader box shall provide suitable means to side shift the box to compensate for variations in the pavement geometry. A burlap drag or other approved screed may be attached to the rear of the spreader box to provide a uniform mat.

c. Auxiliary equipment. Other tools or equipment such as brushes, hand squeegees, hose equipment, tank trucks, water distributors and flushers, power blowers, barricades, etc., shall be provided as required.

d. Roller. The roller, if required, shall be a self-propelled pneumatic-tired roller capable of exerting a contact pressure during rolling of 50 lb / sq inch (350 Newtons per square meter). It shall be equipped with a water spray system, to be used if the slurry is picking up on the tires during rolling.

e. Tack coat and distributor. Normally a tack coat is not required unless the surface to be covered is extremely dry and raveled or is concrete or brick. If required, the tack coat should consist of one part

emulsified asphalt and three parts water. The emulsified asphalt may be the same as that used in the mix. Pressure distributors used for application of the diluted asphalt emulsion tack coat shall be self-propelled, equipped with pneumatic tires, and capable of uniformly applying 0.05 to 0.15 gallon per square yard (0.23 to 0.68 liter per square meter) of the diluted emulsion over the required width of application. Distributors shall be equipped with tachometers, pressure gauges, and volume-measuring devices. The tack coat shall be applied at least two (2) hours before the slurry seal but within the same day.

626-4.3 Equipment calibration. Each slurry mixing unit to be used on the project shall be calibrated in the presence of the APM prior to construction. Previous calibration documentation covering the exact materials to be used may be accepted by the APM provided they were made during the calendar year. The documentation shall include an individual calibration of each material at various settings, which can be related to the machine's metering devices. No machine will be allowed to work on the project until the calibration has been completed and/or accepted by the APM.

626-4.4 Preparation of existing surface. Clean pavement surface immediately prior to placing the seal coat by sweeping, flushing well with water leaving no standing water, or a combination of both, so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease that has not penetrated the asphalt pavement by scraping or by scrubbing with a detergent, then wash thoroughly with clean water. After cleaning, treat these areas with the oil spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

626-4.5 Application of slurry seal surface treatment. The surface shall be pre-wet ahead of the slurry spreader box by fogging at a rate that dampens the surface with no apparent standing water. The slurry mixture shall be at the desired consistency when exiting the mixer. Total time of mixing shall not exceed two (2) minutes. A sufficient amount of slurry shall be carried in all parts of the spreader box at all times so that complete coverage of all surface voids and cracks is obtained. Care shall be taken not to overload the spreader box which shall be towed at a slow and uniform rate not to exceed 5 miles per hour (8 km per hour). No lumping, balling, or unmixed aggregate shall be permitted. No segregation of the emulsion and fines from the coarse aggregate will be permitted. If the coarse aggregate settles to the bottom of the mix, the slurry shall be removed from the pavement surface. A sufficient amount of slurry shall be fed into the box to keep a full supply across the full width of the spreader box. The mixture shall not be permitted to overflow the sides of the spreader box. No breaking of the emulsion will be allowed in the spreader box. The finished surface shall have no more than four (4) tear or drag marks greater than 1/2-inch (12 mm) wide and 4-inch (100 mm) long in any 12-foot (3.7-m) by 22-foot (25-sq m) section. It shall have no tear or drag marks greater than 1 inch (25 mm) wide and 3-inch (15 mm) long.

The finished surface shall have no transverse ripples of 1/4-inch (6 mm) or more in depth, as measured with a 12-foot (3.7 meter) straightedge laid upon the surface.

Adjacent lanes shall be lapped at the edges a minimum of 2 inch (50 mm) with a maximum of 4 inch (100 mm) to provide complete sealing at the overlap. Construction longitudinal and transverse joints shall be neat and uniform without buildup, uncovered areas, or unsightly appearance. All joints shall have no more than 1/4-inch (6 mm) difference in elevation when measured across with a 12-foot (3.7 meter) straightedge.

The fresh slurry seal application shall be protected by barricades and markers and permitted to dry for four (4) to 24 hours, depending on weather conditions. Any damage to uncured slurry shall be repaired at the expense of the Contractor.

In areas where the spreader box cannot be used, the slurry shall be applied by means of a hand squeegee. Upon completion of the work, the seal coat shall have no holes, bare spots, or cracks through which liquids or foreign matter could penetrate to the underlying pavement. The finished surface shall present a uniform and skid resistant texture satisfactory to the APM. All wasted and unused material and all debris shall be removed from the site prior to final acceptance.

Upon completion of the project, the Contractor shall sweep the finished surface with a conventional power rotary broom, to remove any potential loose material from the surface. The material removed by sweeping shall be disposed of in a manner satisfactory to the APM.

626-4.6 Emulsion material (Contractor's responsibility). Samples of the emulsion that the Contractor proposes to use, together with a statement as to its source, shall be submitted, and approval shall be obtained before using such material. The Contractor shall submit to the APM a manufacturer's certified report for each consignment of the emulsion. The manufacturer's certified report shall not be interpreted as a basis for final acceptance. All such reports shall be subject to verification by testing samples of the emulsion received for use on the project.

37.5 METHOD OF MEASUREMENT

626-5.1 The emulsified asphalt shall be measured by the square yard complete in place and accepted by APM.

37.6 BASIS OF PAYMENT

626-6.1 Payment shall be made at the contract unit price per square yard of slurry seal surface treatment areas. These prices shall be full compensation for furnishing all materials, including emulsified asphalt, aggregate, tack coat and for preparing, mixing, and applying these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 67:	Emulsified Asphalt for Slurry Coat, per square yard

37.7 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D977	Standard Specification for Emulsified Asphalt

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2397	Standard Specification for Cationic Emulsified Asphalt
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts International Slurry Surfacing Association (ISSA)
ISSA A-105	Recommended Performance Guidelines for Emulsified Asphalt Slurry Seal
ISSA TB-100	Laboratory Test Method for Wet Track Abrasion of Slurry Surfacing Systems
ISSA TB-106	Slurry Seal Consistency Template
ISSA TB-115	Test Method for Determination of Slurry System Compatibility

END OF ITEM P-626

38 ITEM P-630 REFINED COAL TAR EMULSION WITHOUT ADDITIVES, SLURRY SEAL SURFACE TREATMENT

38.1 DESCRIPTION

630-1.1 This item shall consist of a mixture of emulsified asphalt, mineral aggregate, and water properly proportioned, mixed, and spread on an asphalt pavement surface, including airport pavements serving **airplanes 60,000 lbs or less that need a fuel resistant surface treatment. However, some coal tar products are prohibited for use and as such only the selected materials determined by the APM shall be utilized in order to comply with federal, state, and local authority regulations.**

The purpose of this refined coal tar emulsion product is to provide a fuel-resistant surface where pavements are subjected to fuel spills. The application of the surface treatment shall be in accordance with these specifications and shall conform to the dimensions shown on the plans or as directed by the APM.

630-1.2 General. This item shall consist of a mixture of refined coal tar emulsion, mineral aggregate, and water properly proportioned, mixed, and applied as a slurry seal on new or existing (aged) asphalt concrete pavement.

38.2 MATERIALS

630-2.1 Refined coal tar emulsion. A refined coal tar emulsion prepared from a high temperature refined coal tar conforming to the requirements of ASTM D490 for grade 11-12. The use of oil and water gas tar is not allowed. Base refined coal tar emulsion must conform to all requirements of ASTM D5727.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the APM before the emulsified asphalt is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

a. Health, safety, and environment. The Contractor must provide a complete Safety Data Sheet (SDS) in accordance with U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Regulations (Standards – 29 CFR), 1910.1200 which establishes the requirement and minimum information for the MSDS for hazardous materials. The MSDS, Section II, shall include the Chemical Abstracts Service (CAS) registry numbers for all applicable hazardous ingredients in the coal tar emulsion product. The Contractor must provide the manufacturer's certification that the product complies with the Code of Federal Regulation (CFR) Title 40 – Protection of Environment. The manufacturer's certification shall address compliance for Air Programs, Part 59, National Volatile Organic Compound Emission Standards for Consumer and Commercial Products (for the airport location) and Water Programs, Part 116, Designation of Hazardous Substances.

630-2.2 Aggregate. The aggregate shall be washed dry silica sand or boiler slag free of dust, trash, clay, organic materials or other deleterious substances. The aggregate shall meet the gradation requirements below when tested in accordance with ASTM C136. The refined coal tar emulsion supplier must give written approval of the aggregate used in the mix design.

Gradation of Aggregates*

Sieve Size		Percent Retained	
		Minimum	Maximum
#20 or coarser	850 µm	0	2
#30	600 µm	0	12
#40	425 µm	2	60
#50	300 µm	5	60
#70	212 µm	5	60
#100	150 µm	5	30
#140	106 µm	0	10
#200	75 µm	0	2
Finer than #200		0	0.3

* Table represents the maximum range of aggregate gradations.

630-2.3 Water. Water used in mixing or curing shall be from potable water sources and at least 50°F (10°C). Other sources shall be tested in accordance with ASTM C1602 prior to use. The pH of the water shall conform to the requirements of the coal tar emulsion manufacturer.

630-2.4 Crack sealant. Crack sealant shall be certified for compatibility with the refined coal tar emulsion by the manufacturer of the refined coal tar emulsion, and approved by the APM.

630-2.5 Oil spot primer. Oil spot primer shall be certified for compatibility with the refined coal tar emulsion by the manufacturer of the refined coal tar emulsion, and approved by the APM.

630-2.6 Pavement primer. Pavement primer shall be certified for compatibility with the refined coal tar emulsion by the manufacturer of the refined coal tar emulsion, and approved by the APM.

630-2.7 Alternative Products. Commercially available sealers may be used provided they meet approval by the APM. These products are proprietary formulations that do not contain coal tar and thus do not pose environmental risks and may or may not contain petroleum products.

38.3 COMPOSITION AND APPLICATION

630-3.1 Composition. The refined coal tar emulsion seal coat is to consist of a mixture of refined coal tar emulsion, water and aggregate, and be proportioned as shown in the table below titled “Composition of Mixture Per 100 Gallons of Refined Coal Tar Emulsion.” The composition must have written approval of the coal tar emulsion manufacturer. Alternative products shall be formulated in accordance with manufacturer’s recommendations.

630-3.2 Quantities of materials per square yard. The Contractor shall submit the recommended formulation of water, emulsion, aggregate and application rate proposed for use to a testing laboratory together with sufficient materials to verify the formulation at least **10** days prior to the start of operations. The mix design shall be within the range shown in the table below. No seal coat shall be produced for payment until a mix has been approved by the APM. The formulation shall pass the fuel resistance test in accordance with ASTM D5727.

The mix formula for each mixture shall be in effect until modified in writing by the APM.

Composition of Mixture Per 100 Gallons of Refined Coal Tar Emulsion

Application	Refined Coal Tar Emulsion Gallons	Water Gallons	Aggregate lb	Formula Rate of Application of Mix per Square Yard	
				Minimum Gallons	Maximum Gallons
Prime Coat (where required) as specified by the coal tar emulsion manufacturer					
1st Seal Coat	100	25-30	300-500	0.12	0.17
2nd Seal Coat	100	25-30	300-500	0.12	0.17

630-3.3 Application rate. Application rates are not to exceed 0.17 gal/yd²/coat (0.77 liters/m²/coat), and at no time are total coats to exceed 0.51 gal/yd² (2.3 liters/m²).

630-3.4 Control strip. Prior to full production, the Contractor shall prepare a quantity of mixture in the proportions shown in the approved mix design sufficient to place a control strip a minimum of 250 square yard (209 m²) at the rate specified in the job mix formula if required by the APM. The test area shall be designated by the APM and will be located on a representative section of the pavement to be seal coated. Separate control strips by a minimum of 200 feet between sections. The actual application rate will be determined by the APM during placement of the control strip and will depend on the condition of the pavement surface.

The control strip shall be used to verify the adequacy of the mix design and to determine the application rate. The same equipment and method of operations shall be used on the control strip as will be used on the remainder of the work.

If the control strip proves to be unsatisfactory, the necessary adjustments to the job mix formula, mix composition, application rate, placement operations, and equipment shall be made. Additional control strips shall be placed and evaluated, if required. Full production shall not begin without the APM's approval. Acceptable control strips shall be paid for in accordance with paragraph 630-7.1.

A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the optimum application rate of both emulsion and sand.

38.4 CONSTRUCTION METHODS

630-4.1 Weather limitations. The seal coat shall not be applied when the surface is wet or when the humidity or impending weather conditions will not allow proper curing. The seal coat shall be applied only when the atmospheric or pavement temperature is 50°F (10°C) and rising and is expected to remain above 50°F (10°C) for 24 hours, unless otherwise directed by the APM. Alternative products shall be placed in accordance with manufacturer's recommendations.

630-4.2 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

a. Distributors. Distributors or spray units used for the spray application of the seal coat shall be self-propelled and capable of uniformly applying 0.12 to 0.55 gallons per square yard (0.54 to 2.5 liters per square meter) of material over the required width of application. Distributors shall be equipped with removable manhole covers, tachometers, pressure gauges, and volume-measuring devices.

The mix tank shall have a mechanically powered, full-sweep, mixer with sufficient power to move and homogeneously mix the entire contents of the tank.

The distributor shall be equipped with a positive placement pump so that a constant pressure can be maintained on the mixture to the spray nozzles.

b. Mixing equipment. The mixing machine shall have a continuous flow mixing unit capable of accurately delivering a predetermined proportion of aggregate, water, and emulsion, and of discharging the thoroughly mixed product on a continuous basis. The mixing unit shall be capable of thoroughly blending all ingredients together and discharging the material to the spreader box without segregation.

c. Spreading equipment. Spreading equipment shall be a mechanical-type squeegee distributor attached to the mixing machine, equipped with flexible material in contact with the surface to prevent loss of slurry from the spreader box. It shall be maintained to prevent loss of slurry on varying grades and adjusted to assure uniform spread. There shall be a lateral control device and a flexible strike-off capable of being adjusted to lay the slurry at the specified rate of application. The spreader box shall have an adjustable width. The box shall be kept clean; coal tar emulsion and aggregate build-up on the box shall not be permitted.

d. Hand squeegee or brush application. The use of hand spreading application shall be restricted to places not accessible to the mechanized equipment or to accommodate neat trim work at curbs, etc. Material that is applied by hand shall meet the same standards as that applied by machine.

e. Calibration. The Contractor shall furnish all equipment, materials and labor necessary to calibrate the equipment. It shall be calibrated to assure that it will produce and apply a mix that conforms to the job mix formula. Commercial equipment should be provided with a method of calibration by the manufacturer. All calibrations shall be made with the approved job materials prior to applying the seal coat to the pavement. A copy of the calibration test results shall be furnished to the APM.

630-4.3 Preparation of asphalt pavement surfaces. Clean pavement surface immediately prior to placing the seal coat by sweeping, flushing well with water leaving no standing water, or a combination of both, so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease that has not penetrated the asphalt pavement by scraping or by scrubbing with a detergent, then wash thoroughly with clean water. After cleaning, treat these areas with the oil spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

630-4.4 Mixing. Blend the coal tar emulsion mixture in the equipment described in paragraph 630-4.2 using the ingredients described in paragraph 630-3.2. The mixing must produce a smooth homogeneous mixture of uniform consistency. (Consult coal tar emulsion supplier for its recommended order of addition of the ingredients.) During the entire mixing and application process, no breaking, segregating or hardening of the emulsion, nor balling or lumping of the sand is to be permitted. Continue to agitate the seal coat mixture in the mixing tank at all times prior to and during application so that a consistent mix is available for application.

Small additional increments of water may be needed to provide a workable consistency, but in no case is the water content to exceed the specified amount.

630-4.5 Application of slurry seal surface treatment. The aggregate filled slurry seal surface treatment shall be applied at a uniform rate determined in paragraphs 630-3.2 and 630-3.3.

In order to provide maximum adhesion, the pavement shall be dampened with a fog spray of water if recommended by the supplier. No standing water shall remain on the surface.

If a prime coat is required, mix and apply the prime coat as specified in paragraph 630-3.2. Apply the first coat uniformly to obtain the rate determined in paragraph 630-3.4.

Each coat shall be allowed to dry and cure initially before applying any subsequent coats. The initial drying shall allow evaporation of water of the applied mixture, resulting in the coating being able to sustain light foot traffic. The initial curing shall enable the mixture to withstand vehicle traffic without damage to the seal coat.

Apply the second coat in the same manner as outlined for the first coat. Additional coats shall be applied over the entire surface as directed by the APM. The finished surface shall present a uniform texture.

The final coat shall be allowed to dry a minimum of eight hours in dry daylight conditions before opening to traffic and initially cure enough to support vehicular traffic without damage to the seal coat.

Where marginal weather conditions exist during the eight-hour drying time, additional drying time shall be required. The length of time shall be as specified by the supplier. The surface shall be checked after the additional drying time for trafficability before opening the section to vehicle traffic.

Where striping is required, the striping paint used shall meet the requirements of Item P-620, shall be compatible with the seal coat and as recommended by the coal tar emulsion manufacturer.

38.5 QUALITY CONTROL

630-5.1 Contractor's certification. The Contractor shall furnish the manufacturer's certification that each consignment of emulsion shipped to the project meets the requirements of ASTM D5727, except that the water content shall not exceed 50%. The certification shall also indicate the solids and ash content of the emulsion and the date the tests were conducted. The certification shall be delivered to the APM prior to the beginning of work. The manufacturer's certification for the emulsion shall not be interpreted as a basis for final acceptance. Any certification received shall be subject to verification by testing samples received for project use.

The Contractor shall also furnish a certification demonstrating a minimum of three years' experience in the application of coal tar emulsion seal coats. . For alternative materials a manufacturer's representative shall be available during planning and installation of the product.

630-5.2 Sampling. A minimum of one sample per day shall be tested for the properties in the table above titled "Composition of Mixture Per 100 Gallons of Refined Coal Tar Emulsion." A random sample of approximately one-quart of the composite mix will be obtained daily by the Contractor and stored in a glass container. The

containers shall be sealed against contamination and retained in storage by the Owner for a period of six months. Samples shall be stored at room temperature and not be subjected to freezing temperatures.

A sample of undiluted coal tar emulsion shall be obtained from each consignment shipped to the job.

630-5.3 Records. The Contractor shall maintain an accurate record of each batch of materials used in the formulation of the seal coat and provide the documentation to the APM daily.

38.6 METHOD OF MEASUREMENT

630-6.1 The Jet Fuel Resistant Seal Coat including refined coal tar emulsion and aggregate shall be measured by the square yards placed and accepted by APM.

38.7 BASIS OF PAYMENT

630-7.1 Payment shall be made at the contract unit price per square yard for the Jet Fuel Resistant Seal Coat completed and accepted by APM.

These prices shall be full compensation for furnishing all materials, preparing, mixing, and applying these materials, and for all labor, equipment, tools, including refined coal tar emulsion and aggregate and incidentals necessary to complete the item.

Payment will be made under:

Item 68:	Jet Fuel Resistant Seal Coat, per square yard

38.8 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C67	Standard Test Method for Sampling and Testing Brick and Structural Clay Tile
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D490	Standard Specification for Road Tar
ASTM D3699	Standard Specification for Kerosine
ASTM D5727	Standard Specification for Emulsified Refined Coal Tar (Mineral Colloid Type)

Code of Federal Regulations (CFR)

29 CFR Part 1910.1200	Hazard Communication
40 CFR	Protection of the Environment

END OF ITEM P-630

39 ITEM F-161 WIRE FENCE WITH STEEL POSTS

39.1 DESCRIPTION

161-1.1 This item covers the requirements for furnishing materials and constructing new wire fences and gates with steel posts in accordance with the details included herein and as shown on the plans (non-security fencing). The class of fence to be erected shall be either woven wire fencing surmounted by three strands of barbed wire, or three strands of barbed wire on each outrigger, as indicated on the plans and the bid proposal. Class D wire fence shall be used when no class is indicated on the plans.

39.2 MATERIALS

161-2.1 Wire.

a. Woven wire (zinc-coated). The woven wire fencing shall be 7-bar, 26-inch (66 cm) field fence with top and bottom wires No. 10 gauge, and filler and stay wires No. 12-1/2 gauge. Stay wires shall be spaced 6 inches (150 mm) apart. All wire shall be smooth galvanized steel wire conforming to ASTM A116. All wires shall be twice-dipped and spaced as shown on the plans.

b. Barbed wire (zinc-coated). Zinc-coated barbed wire shall be 2-strand twisted No. 12-1/2 gauge galvanized steel wire with 4-point barbs of No. 14 gauge galvanized steel wire. All wire shall conform to ASTM A121, Type A. The barbs shall be spaced approximately 5 inches (125 mm) apart.

c. Barbed wire (copper-covered). Copper-covered steel barbed wire shall conform to ASTM A121, Type A.

d. Barbed wire (aluminum-coated). Aluminum-coated steel barbed wire shall be 2-strand twisted No. 12-1/2 gauge. The 4-point barbs of No. 14 gauge aluminum-coated steel wire shall be spaced approximately 5 inches (125 mm) apart. The steel wire shall have a tensile strength of between 60,000 and 80,000 pounds per square inch (413 400 and 551 200 kPa) and the aluminum coating shall have a minimum weight of 0.30 ounces per square foot (0.07 kg/m²) of wire surface on the No. 12-1/2 gauge line wire and 0.25 ounces per square foot (0.06 kg/m²) of wire surface on the No. 14 gauge barbs.

e. Bracing wire (zinc-coated). Wire used for cable bracing shall be No. 9 smooth galvanized soft wire.

161-2.2 Fence posts, gates, rails, braces, and accessories. These items, when specified, shall conform to the requirements of Federal Specification RR-F-191 and shall be zinc-coated.

161-2.3 Concrete. Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 3,000 psi.

161-2.4 Privacy Screen. Cloth screening shall be installed on the fencing as directed by APM to obscure visibility. It shall have the following properties of:

Polypropylene close mesh with solid weave pattern, minimum 5.6 oz / sq yard Color: Green High UV resistance

Shading: Provides 80 to 90% shade Hems: heavy 3 ply tape reinforced hems

Grommets: Brass Grommets 2 feet apart on all sides

Prior to use the Contractor shall submit a sample for approval by APM.

39.3 CONSTRUCTION METHODS

161-3.1 General. The fence shall be constructed in accordance with the details on the plans and as specified here using new materials. All work shall be performed in a workmanlike manner satisfactory to the APM. The APM shall establish and mark the property line or fence line for the work. The Contractor shall span the opening below the fence with barbed wire at all locations where it is not practical to conform the fence to the general contour of the ground surface because of natural or manmade features such as drainage ditches. The new fence shall be permanently tied to the terminals of existing fences whenever required by the APM. The finished fence shall be plumb, taut, true to line and ground contour, and complete in every detail. When directed, the Contractor shall stake down the woven wire fence at several points between posts.

The Contractor shall arrange the work so that construction of the new fence will immediately follow the removal of existing fences. The length of unfenced section at any time shall not exceed 300 feet (90 m). The work shall progress in this manner and at the close of the working day the newly constructed fence shall be tied to the existing fence.

161-3.2 Clearing fence line. The site of the fence shall be sufficiently cleared of obstructions, and surface irregularities. The fence line shall be graded so that the fence will conform to the general contour of the ground. The fence line shall be cleared on each side of the centerline of the fence. This clearing shall consist of the removal of all stumps, brush, rocks, trees, or other obstructions that will interfere with proper construction of the fence. Stumps within the cleared area of the fence shall be grubbed or excavated. The bottom of the fence shall be placed a uniform distance above ground, as specified in the plans. When shown on the plans or as directed by the APM, the existing fences which interfere with the new fence location shall be removed by the Contractor as a part of the construction work unless such removal is listed as a separate item in the bid schedule. All holes remaining after post and stump removal shall be refilled with suitable soil, gravel, or other suitable material and compacted with tampers.

The work shall include the handling and disposal of all material cleared, excavated or removed, regardless of the type, character, composition, or condition of such material encountered.

161-3.3 Installing posts. All posts shall be spaced as shown on the plans. Corner, brace, anchor, end, and gate posts shall be set in concrete as shown on the plans. The top of the concrete shall be slightly above the ground surface, trowel finished, and sloped to drain. Post holes of full depth and size for the concrete shall be provided. All line posts may be either driven or set in dug holes to a depth of 3 feet (1 m). All post setting shall be done carefully and to true alignment. Dirt removed for placing posts, anchor bars, flanges, etc., shall be replaced, tamped, and leveled. When posts are driven, care shall be exercised to prevent marring or buckling of the posts. Damaged posts shall be replaced at the Contractor's expense. No extra compensation will be made for rock excavation.

161-3.4 Bracing. All corner, anchor, end, and gate posts shall be braced as shown on the plans. Anchor posts shall be set at approximately 500 feet (150 meters) intervals and braced to the adjacent posts.

161-3.5 Installing wire. All barbed wire and woven wire shall be placed on the side of the post away from the airport, or as directed by the APM, at the height indicated on the plans. The woven wire shall be carefully stretched and hung without sag and with true alignment. Care shall be taken not to stretch the wire so tightly that it will break in cold weather or pull up corner and brace posts. All horizontal wires shall be fastened securely to each post by fasteners or clips designed for use with the posts furnished. The woven wire shall be wrapped around end, corner, and gate posts, and the ends of all horizontal wires shall be tied with snug, tight twists. The wire shall be secured to prevent slipping up and down the post. Barbed wire strands shall be stretched and each strand secured to each post to prevent slipping out of line or becoming loose. At end, corner, and gate posts the barbed wire shall be securely wrapped and anchored once about the post from outside and secured against slipping by

tying the ends with snug, tight twists. However, on spans of less than 100 feet (30 m) both ends of the span need not be wrapped around the posts. The bottom wire of the woven wire fencing shall clear the ground by not more than 4 inches (100 mm) or less than one inch (25 mm) at any place.

161-3.6 Splicing wire. Splices in barbed and woven wire will be permitted if made with an approved galvanized bolt-clamp splice or a wire splice made as follows: The ends of each wire shall be carried 3 inches (75 mm) past the splice tool and wrapped around the other wire for at least six turns in opposite directions. After the tool is removed, the space occupied by it shall be closed by pulling the ends together. The unused ends of the wire shall be cut close to make a neat, workmanlike job.

161-3.7 Installing gates. The gates shall be hung on gate fittings as shown on the plans. They shall be attached in such a manner that the gate cannot be lifted off the hinges. Gates shall be erected to swing in the direction indicated and shall be provided with gate stops, as specified or as shown on the plans. Gates shall be erected at locations shown on the plans.

161-3.8 Existing fence connections. Wherever the new fence joins an existing fence, either at a corner or at the intersection of straight fence lines, a corner or anchor post shall be set at the junction and braced and anchored the same as herein described for corner posts.

If the connection is made at other than the corner of the new fence, the last span of the old fence shall contain a brace span.

161-3.9 Electrical grounds. Electrical grounds shall be constructed where a power line passes over the fence the ground shall be installed directly below the point of crossing. The ground shall be accomplished with a copper clad rod 8 feet (2.4 m) long and a minimum of 5/8 inches (16 mm) in diameter driven vertically until the top is 6 inches (150 mm) below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction. The Contractor shall comply with FAA-STD-019, Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment, paragraph 4.2.3.8, Lightning Protection for Fences and Gates, when fencing is adjacent to FAA facilities.

161-3.10 Cleaning up. The Contractor shall remove from the vicinity of the completed work all tools, buildings, equipment, etc., used during construction. All disturbed areas shall be seeded per FAA Item T- 901.

39.4 METHOD OF MEASUREMENT

161-4.1 Fences shall be measured in linear feet in place from outside to outside of end posts or corner posts and shall be the length of fence actually constructed, except for the space occupied by the gates.

161-4.2 Green Fabric for Fence shall be measured in square feet of green fabric installed and accepted.

39.5 BASIS OF PAYMENT

161-5.1 Payment shall be made at the contract unit price per linear foot for wire fence of the type specified. This price shall be full compensation for furnishing all materials and for all preparation, erection, and installation of these materials, including posts and barbed wire, and for all labor, equipment, tools, and incidentals necessary to complete the item.

161-5.2 Payment will be made at the contract unit price per square foot for green fabric for fence. This price shall be full compensation for furnishing all materials and for all preparation, erection, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item 86:	Install Fence, (Permanent 8') with 3 Strands Barbed Wire, per linear foot
Item 87:	Install Fence, (Permanent 8') with Outriggers and 3 Strands Barbed Wire on Each Outrigger, per linear foot
Item 88:	Green Fabric for Fence (Privacy Screen) per square foot

39.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A116	Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric

ASTM A121	Standard Specification for Metallic-Coated Carbon Steel Barbed Wire

FAA Standard

FAA-STD-019	Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment

Federal Specification (FED SPEC)

FED SPEC RR-F-191/Gen	Fencing, Wire, and Post Metal (and Gates, Chain-link Fence Fabric, and Accessories) (General Specification)

FAA Orders

5300.38	AIP Handbook

END OF ITEM F-161

40 ITEM D-751 MANHOLES, CATCH BASINS, INLETS AND INSPECTION HOLES

40.1 DESCRIPTION

751-1.1 This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the APM.

40.2 MATERIALS

751-2.1 Brick. The brick shall conform to the requirements of ASTM C32, Grade MS.

751-2.2 Mortar. Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

751-2.3 Concrete. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 Precast concrete pipe manhole rings. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

751-2.5 Corrugated metal. Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

751-2.6 Frames, covers, and grates. The castings shall be as shown on the plans and conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 Steps. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel as shown on the plans. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

751-2.8 Precast inlet structures. Manufactured in accordance with and conforming to ASTM C913.

40.3 CONSTRUCTION METHODS

751-3.1 Unclassified excavation.

a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the APM. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the APM may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the APM. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.

e. After excavation is completed for each structure, the Contractor shall notify the APM. No concrete or reinforcing steel shall be placed until the APM has approved the depth of the excavation and the character of the foundation material.

751-3.2 Brick structures.

a. Foundations. A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed in accordance with the requirements of Item P-610.

b. Laying brick. All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted. An ample layer of mortar shall be spread on the beds and a shallow furrow shall be made in it that can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and re-laid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick

shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.

c. Joints. All joints shall be filled with mortar at every course. Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch (9 mm) thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch (6 mm) nor more than 1/2 inch (12 mm) wide and the selected joint width shall be maintained uniform throughout the work.

d. Pointing. Face joints shall be neatly struck, using the weather-struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used, the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.

e. Cleaning. Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.

f. Curing and cold weather protection. The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50°F (10°C) unless the Contractor has, on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60°F (16°C) for the duration of the curing period.

751-3.3 Concrete structures. Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the APM before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

751-3.4 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another APM approved third party certification program.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

751-3.5 Corrugated metal structures. Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on

the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

751-3.6 Inlet and outlet pipes. Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

751-3.7 Placement and treatment of castings, frames, and fittings. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the APM, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the APM. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

751-3.8 Installation of steps. The steps shall be installed as indicated on the plans or as directed by the APM. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the APM.

751-3.9 Backfilling.

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the APM.

b. Backfill shall not be placed against any structure until approved by the APM. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

751-3.10 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the APM. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

40.4 METHOD OF MEASUREMENT

751-4.1 Manholes, catch basins, inlets, and inspection holes shall be measured by the unit.

40.5 BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials including concrete and reinforcing steel, and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

- Item 82: Manholes, per each
- Item 83: Catch Basins, per each
- Item 84: Inlets, per each
- Item 85: Inspection Holes, per each

40.6 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)

ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.
AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains

END OF ITEM D-751

Airfield Repair Specifications

41 A-1. JOINT RESEALING REPAIR

41.1 DESCRIPTION

The work of this Section consists of resealing construction, contraction and expansion joints on the existing PCC pavement with a joint sealant. It includes the removal of existing joint sealant and backing, re-sawing existing joints when needed, water blasting and air blowing joint cavity, installing joint sealant and backing, and all necessary containment, clean-up work and removal of all debris to an off -site location.

41.2 MATERIALS

41.2.1 Joint Sealant:

Joint sealant materials for concrete pavement shall meet one or more of the following requirements:

41.2.2 Cold Applied Joint Sealant:

ASTM D5893 Standard Specifications for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements and conforming to Specification Item P-605, "Joint sealants for Pavements".

41.2.3 Alternate A Hote Applied Joint Sealant:

ASTM D7116 Standard Specification for Joint Sealants, Hot Applied, Jet Fuel Resistant Types for Portland Cement Concrete Pavements and conforming to Specification Item P-605, "Joint sealants for Pavements".

41.2.4 Backer Rod:

The backer rod material shall provide a bond - break for the joint sealant, and it shall be a closed cell polyethylene backer rod material, cross linked for hot-applied sealants and capable of withstanding temperatures of 395°F for 30 minutes, and conforming to the requirements of ASTM D5249.

41.2.5 Masking Tape (High Temperatures):

The masking tape (high temperature) shall provide a bond-break for the joint sealant, and it shall be able to resist a temperature of 395°F for 30 minutes, and conforming to the requirements of ASTM D5249.

41.3 SUBMITTALS

Prior to beginning work, the Contractor shall submit to APM for approval the following:

- a. Product information, manufacturer's specification, test reports and certificate of compliance for each type of joint sealant material.
- b. Product information, manufacturer's specification, installation procedure and certificate of compliance for backer rod.

41.4 CONSTRUCTION METHODS

41.4.1 Preparation of Existing Joints:

Remove existing joint sealant and backing (either backer rod or bond breaker tape) by routing or plowing (joint plow tool attached to a skid-steer loader to remove old sealer from joints). Any remaining sealant will be removed by use of wire brushes or other tools as necessary. In some instances, re-sawing the joints may be required. This is only recommended in areas where the existing joint faces cannot be thoroughly cleaned to satisfactorily promote the effectiveness and adherence of the new sealant. If re-sawing the joints is required, immediately after sawing, the resulting slurry will be completely removed from the joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary. The joints will be allowed sufficient time to dry prior to preparation for re-sealing. The joint reservoir width to depth of sealant ratio should be as close to 1:1 as practical when re-sawing is required. The use of backer material is recommended to obtain the desired ratio at the reservoir or as recommended by the sealant manufacturer. Using appropriate concrete saw equipment with diamond blades, widen existing joints to the indicated widths and deepen where required. All laitance and other foreign materials shall then be removed by thorough scraping, sweeping and vacuuming of the PCC pavement.

Immediately before sealing, the joints shall be thoroughly cleaned of all laitance and other foreign material. Cleaning shall be accomplished through water-blasting equipment or other methods with prior written approval from APM. The Contractor must demonstrate that water-blasting equipment including the pumps, hose, guide and nozzle size, under job conditions and before approval of pavement joints for application of material in this specification are dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the APM, that the method cleans the joint and does not damage the joint. Upon completion of cleaning, the joints shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps shall be used to prepare the joints for sealing. The joint faces shall be surface dry when the seal is applied. The surface of the installed sealant material shall be 1/4-inch to 3/8-inch below the existing pavement surface.

Sandblasting is not allowed on the airfield.

41.4.2 Installation of Sealant:

Joints shall be inspected for proper width, depth, alignment, and preparation by APM, and approved by APM before sealing is permitted. The joint faces shall be surface dry before the installation of the sealant. Sealants shall be installed in accordance with the following requirements:

41.4.3 Backer Rod and Bond Breaker Material:

The use of a backer rod material or bond breaker in the bottom of the joint to be filled is recommended to control the depth of the sealant, to achieve the desired shape factor, reservoir width to depth ration, and to support the sealant against indentation and sag. Backer rod materials and bond breakers should be compatible with the sealant, should not adhere to the sealant, should be compressible without extruding the sealant, and should recover to maintain contact with the joint faces when the joint is open. The backer rod will be 25 percent larger in diameter than the width of the reservoir. Install backer rod or masking tape (high temperature) as indicated to bottom of joint to prevent bond of joint sealant to bottom of joint. This material shall be continuous with no void spaces at lapped splices and interactions.

41.4.4 Installation of Sealants:

Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by APM before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to between 1/4-inch and 3/8-inch below existing pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by APM. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

41.4.5 Hot Poured Sealants:

The joint sealant shall be applied uniformly solid from bottom to top of joint, and it shall be installed without the formation of entrapped air or voids. The sealant surface when complete will be between 1/4-inch and 3/8-inch below existing pavement surface. A backing material will be placed to obtain the desired width to depth of sealant ratio and will be both non-reactive and non-adhesive to the pavement or the sealant material. The heating kettle will be an indirect heating type, constructed as a double boiler. A positive temperature control and mechanical agitation will be provided. The sealant will not be heated to more than 20°F (-11°C) below the safe heating temperature. The safe heating temperature can be obtained from the manufacturer's shipping container. A direct connecting pressure type extruding device with nozzles shaped for insertion into the joint will be provided. Any sealant spilled on the surface of the pavement, structures and/or lighting fixtures will be removed immediately.

The heating kettle for the joint sealant shall be an indirect heating type, constructed as a double boiler. A positive temperature control and mechanical agitation shall be provided. The joint sealant shall not be heated to more than 200°F below the safe heating temperature. The safe heating temperature can be obtained from the manufacturer's shipping container. A direct connecting pressure type extruding device with nozzle shaped for insertion into the joint shall be provided. Any sealant spilled on the surface of the pavement, structures and/or lighting fixtures will be removed immediately.

41.4.6 Time of Application:

Joints will be sealed as soon after completion of the pavement preparation as feasible and preferably before the pavement is opened to traffic, including construction equipment. The pavement temperature must be above 50°F at the time of installation of the hot-applied joint sealing material. The pavement temperature must be above 40°F at the time of installation of the cold-applied joint sealing material.

Note: If cold-applied sealant is utilized, comply with manufacturer's recommendations, including application of primer for sealant.

41.4.7 Containment:

Dust and debris from work performed on the ramp adjacent to the Terminal shall be contained. Airline offices, baggage handling systems, and other Terminal facilities shall be protected from dust and debris at all times. The

Contractor shall submit a containment plan to APM for approval prior to the start of work.

41.4.8 Clean-Up:

Any sealant spilled on the surface of the PCC pavement shall be removed immediately. Then clean surface of the adjacent PCC pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location. In addition to sweeping and vacuuming, all surfaces covered in dust and debris located on the ramp adjacent to the Terminal shall be washed thoroughly after each shift. Runoff from the washing shall be contained and removed to an off-site location. No runoff from washing shall enter the storm drain system.

41.5 METHOD OF MEASUREMENT

Joint repairs by resealing shall be measured by the linear foot of joint sealant replaced, completed and accepted by APM.

41.6 BASIS OF PAYMENT

Payment for joint repairs by resealing shall be made at the contract unit price per linear foot of joint sealant replaced. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, and placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Bid Item 69: Jet Fuel Resistant Joint Resealing PCC, per linear foot

END OF SECTION A-1

42 A-2. INTERIOR CAVITY AND SPALL REPAIR

42.1 DESCRIPTION

The work of this section consists of repairing interior cavities and spalls on the existing PCC pavement with a polymer concrete. It includes the removal of existing concrete by saw-cutting and chipping, priming concrete, and all necessary clean-up work and removal of all debris to an off-site location.

42.2 MATERIALS

42.2.1 Polymer Concrete:

The polymer concrete shall be a rapid setting, polymer-modified, early strength concrete, or polyester polymer concrete approved by APM, having the following minimum properties:

Compressive strength (ASTM C109)	2,500 psi at 3 hours 6,000 psi at 7 days
Flexural strength (ASTM C78)	1,200 psi at 7 days
Bond strength (ASTM C882)	2,000 psi at 1 day 2,500 psi at 7 days
Coefficient of Thermal Expansion (ASTM T336)	$<10 \times 10^{-6}$ in/in/°F
Length change, ASTM C157	28 Days Wet, +0.03% 28 Days Dry, -0.05%

Mixing water shall be clean and potable.

A pre-construction conference shall be held with the manufacturer's representative of the polymer concrete to discuss construction requirements and methodology. In addition, the manufacturer's representative shall be present during the first two days of application of the polymer concrete.

42.3 SUBMITTALS

Prior to beginning work, submit to APM for approval product data and installation procedures for polymer concrete and primer. This shall also include data for the 3/8-inch maximum aggregate, including approval by the mortar manufacturer for its use. Do not begin work until written approvals are given by APM.

42.4 CONSTRUCTION METHODS

42.4.1 Surface Preparation:

Remove existing deteriorated concrete by a vertical sawcut, 2 inches in depth, and chip out to the indicated limits. Over sawing of the repair area will not be allowed. Accomplish concrete removal in spalled areas with light, hand-held, high frequency chipping hammers weighting not more than 30 pounds or other approved hand tools. During concrete removal, care shall be taken to not spall, undermine or further damage the vertical sawcut. If the sawcut area is damaged, a new sawcut shall be made to encompass the damaged area. The use of jackhammers weighting more than 30 pounds and pavement breaker devices mounted on or pulled by mobile equipment is expressly prohibited. The horizontal surface of the repair area should be left rough with no loose pieces. Clean the cavity surface by water blasting. Upon completion of cleaning, the surface shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps shall be used to prepare the surface. Prior to the application of polymer concrete, this surface shall be dry.

42.4.2 Mixing Polymer Concrete:

Mixing shall be done in a mortar mixer in accordance with the manufacturer's instructions. The maximum amount of water shall be closely monitored and never exceeded. Use minimum recommended water when possible. Mix to a uniform consistency with a maximum mixing time of 5 minutes, per manufacturer specifications.

42.4.3 Application & Finishing Polymer Concrete:

The prepared surface shall be saturated dry surface with no standing water. Initially a thin coat of a polymer primer (consisting of a mortar from the polymer concrete) shall be thoroughly scrubbed into all faces of the cavity using a stiff bristled brush to a depth of 1/16 inch, filling all pores and voids. Place polymer concrete against sawcut edges of repair, working toward center of repair; do not place in layers. After filling cavity, thoroughly consolidate with small vibrator and then screed. Screed from the center of patch out to the edges to push polymer concrete against edge interfaces. Polymer concrete shall be applied within 15 minutes after application of water to mix. Finish concrete with a broom or burlap - drag to produce a finish to match the adjacent existing surfaces.

42.4.4 Curing Polymer Concrete:

Repair materials shall be cured in accordance with the manufacturer's specifications and recommendations. The method needed to protect the repair material depends upon temperature, humidity, and wind. Wet burlap or ponding are the preferred curing methods. Consult the manufacturer about an appropriate curing schedule.

42.4.5 Clean-Up:

Clean surface of the adjacent PCC Pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

42.5 METHOD OF MEASUREMENT

Interior cavity and spall repairs by application of a polymer concrete shall be measured by the square inch of surface area of the polymer concrete repairs, complete and accepted by APM.

42.6 BASIS OF PAYMENT

Payment for interior cavity and spall repairs by application of a polymer concrete shall be made at the contract unit price per square inch of surface area of the repairs. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the interior cavity or spall repair.

Payment will be made under:

Bid Item 70: Interior Cavity & Spall Repair PCC, per square inch

END OF SECTION A-2

43 A-3. PCC SPALL REPAIR - SLAB CORNER AND EDGE

43.1 DESCRIPTION

The work of this Section consists of repairing spalled corners and edges on the existing PCC pavement with a polymer concrete. It includes the removal of existing unsound PCC pavement by saw-cutting and chipping, priming concrete surfaces, placing and finishing polymer concrete, installing joint sealant, and all necessary removals and clean - up work and removal of all debris to an off - site location.

43.2 MATERIALS

43.2.1 Polymer Concrete:

The polymer concrete shall be a rapid setting, polymer-modified, early strength concrete, or polyester polymer concrete approved by APM, having the following minimum properties:

Compressive strength (ASTM C-109)	2,500 psi at 3 hours 6,000 psi at 28 days
Flexural strength (ASTM C-78)	1,200 psi at 7 days
Bond strength (ASTM C-882)	2,000 psi at 1 day 2,500 psi at 7 days
Coefficient of Thermal Expansion (ASTM T336)	$<10 \times 10^{-6}$ in/in/°F
Length change, ASTM C 157	28 Days Wet, +0.03% 28 Days Dry, -0.05%

Mixing water shall be clean and potable.

A pre-construction conference shall be held with the manufacturer's representative of the polymer concrete to discuss construction requirements and methodology. In addition, the manufacturer's representative shall be present during the first two days of application of the polymer concrete.

43.2.2 Joint Sealant:

The joint sealant shall be the following types:

43.2.3 Cold Applied Joint Sealant:

ASTM D5893 Standard Specifications for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements and conforming to Specification Item P-605, "Joint sealants

for Pavements.”

43.2.4 Alternate A Hot Applied Joint Sealant:

ASTM D7116 Standard Specification for Joint Sealants, Hot Applied, Jet Fuel Resistant Types for Portland Cement Concrete Pavements and conforming to Specification Item P-605, "Joint sealants for Pavements.”

43.2.5 Backer Rod:

The backer rod shall provide a bond-break for the joint sealant, and it shall be a closed cell polyethylene backer rod material, cross linked for hot-applied sealants and capable of withstanding temperatures of 395°F for 30 minutes and conforming to the requirements of ASTM D5249.

43.2.6 Masking tapes (High temperature):

The masking tape (high temperature) shall provide a bond-break for the joint sealant, and it shall be able to resist a temperature of 395°F for 30 minutes, and conforming to the requirements of ASTM D5249.

43.2.7 Preformed Joint Filler:

Preformed joint filler shall be a closed cell isomeric polymer foam compatible with the joint sealant, approved by APM. It shall be easy to cut and form. Preformed joint filler material properties shall meet requirements of ASTM D1752.

43.2.8 Caulking:

Caulking shall be a 2-component, polyurethane-base, elastomeric sealant conforming to ASTM C666.

43.3 SUBMITTALS

Prior to beginning work, submit to APM for approval product data and installation procedures for polymer concrete, Joint sealant, backer rod, masking tape (high temperature), preformed joint filler and caulking. Do not begin work until written approvals are given by APM.

43.4 CONSTRUCTION METHODS

43.4.1 Surface Preparation:

Prior to commencement of work, a survey to determine areas of unsound or delaminated concrete should be made to establish the repair boundaries. If spall cavity width is less than 2 inches, the spalls shall be repaired by cleaning and filling with joint sealant in lieu of polymer concrete.

During the survey, all areas of unsound concrete or delamination should be determined by using a sounding technique. Sounding the pavement to find delamination and spall removal areas is accomplished by striking the existing concrete surface with a steel rod or carpenters hammer. Delaminated or unsound concrete will produce a dull or hollow thud, while sound concrete will produce a sharp metallic ring. The repair boundaries should be extended beyond the detected delaminated or spalled area by 2 inches to assure removal of all unsound concrete. The repair boundaries should be kept square or rectangular in line with the jointing pattern to avoid irregular shapes. If repair areas are closer than 18 inches apart, they should be combined. Repair Boundaries must be

approved by APM. If depth of repair exceeds 1/3 of slab thickness, a full depth repair shall be the preferred repair method, as approved by APM.

Remove existing deteriorated concrete by saw-cutting and chipping to the indicated limits. Location of repair to be determined in the field and clearly marked and approved by APM. Saw cuts will be straight lines forming rectangular areas. Pneumatic hammer weight for chipping shall not exceed 30 pounds (to protect adjacent concrete). Make additional saw cuts as needed to speed removal. The resulting bottom surface shall have an aggregate-fractured surface with a minimum surface profile of at least 1/8-inch. Remove existing joint sealant and backing materials to the indicated limits.

Clean the exposed and cavity surface by water-blasting equipment or other methods with prior written approval from APM. Upon completion of cleaning, the surface shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps shall be used to prepare the surface. Allow patch area to dry completely if required by the patch material specification. Prior to the application of polymer concrete, this surface shall be dry.

Sandblasting is not allowed on the airfield.

Carefully cut and shape preformed joint filler to match the vertical surface of the repair cavity as indicated. Completely caulk the perimeter of the preformed joint filler as indicated to prevent polymer concrete leakage to the adjacent existing concrete surfaces. (Preformed joint filler serves as a buffer to prevent the adjacent concrete from exerting expansive forces on the polymer concrete repair.)

When spall repairs are required on each side of a joint or crack, preformed joint filler shall be secured with temporary rigid lateral support, in alignment with the joint or crack after breaking out the spalled concrete. Application of polymer concrete shall be done through staging each side of the joint or crack. Under no circumstances should a spall repair bridge a joint or crack.

If a dowel is exposed during the concrete removal, a full depth repair shall be the preferred repair method, See Specification 5, as approved by APM. If deterioration extends below the top third of the slab, a full depth repairs shall be the preferred repair method. The width of the repair shall be a minimum of 3 inches from joint face and shall not exceed 18 inches.

43.4.2 Mixing Polymer Concrete:

Mixing shall be done in a mortar mixer in accordance with the manufacturer's specifications. The maximum amount of aggregate and water shall be closely monitored and never exceeded. Use minimum recommended water when possible. Mix to a uniform consistency with a maximum mixing time of 5 minutes, per manufacturer's specifications.

43.4.3 Application & Finishing Polymer Concrete:

The prepared surface shall be saturated surface dry with no standing water. Initially a thin coat of a polymer primer (consisting of a mortar from the polymer concrete) shall be thoroughly scrubbed into all faces of the cavity using a stiff bristled brush to a depth of 1/16 inch, filling all pores and voids. Place polymer concrete against sawcut edges of repair, working toward center of repair; do not place in layers. After filling cavity, thoroughly consolidate with small vibrator and then screed, per manufacturer's specifications. Screed from the center of patch out to the edges to push polymer concrete against edge interfaces. Polymer concrete shall be applied within 15 minutes after application of water to mix, per manufacturer's specifications.

Finish concrete with a broom or burlap-drag to produce a finish to match the adjacent existing surfaces. Tool edges when indicated.

43.4.4 Curing Polymer Concrete:

Repair materials shall be cured in accordance with the manufacturer's specifications and recommendations. The method needed to protect the repair material would depend upon temperature, humidity, and wind. Wet burlap or ponding are the preferred curing methods. Consult the manufacturer for appropriate curing schedule.

43.4.5 Installation of Sealant:

After a period of at least 1 day following placement of polymer concrete and completion of curing, carefully saw the preformed joint filler to the depth indicated. Immediately before sealing, the joints shall be thoroughly cleaned of all laitance and other foreign material by thorough water-blasting. Cleaning shall be accomplished through water-blasting equipment or other methods with prior written approval from APM. The Contractor must demonstrate that water-blasting equipment including the pumps, hose, guide and nozzle size, under job conditions and before approval of pavement joints for application of material in this specification are dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the APM, that the method cleans the joint and does not damage the joint. Upon completion of cleaning, the joints shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps shall be used to prepare the joints for sealing.

Then install joint sealant and backing per Specification A-1, Paragraph 1-4.2. Saw overcut shall be filled with sealant material.

43.4.6 Clean-Up:

Any debris spilled on the surface of the PCC pavement shall be removed immediately. Then clean surface of the adjacent PCC pavement by thorough sweeping and/or vacuuming of all debris to prevent injection by aircraft engines; remove debris to an off-site location.

43.5 METHOD OF MEASUREMENT

Corner and edge spall repairs by application of a polymer concrete and joint sealant shall be measured by the square foot of surface area of the polymer concrete repairs, completed and accepted by APM.

43.6 BASIS OF PAYMENT

Payment for corner and edge spall repairs by application of a polymer concrete and joint sealant shall be made at the contract unit price per square foot of surface area of the repairs. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the spall repair.

Payment will be made under:

Bid Item 71: PCC Spall Repair - Corner & Edge, per square foot

END OF SECTION A-3

44 A-4. FULL DEPTH PCC PAVEMENT REPAIR

44.1 DESCRIPTION

The work of this Section consists of repairing PCC (Portland Cement Concrete) pavement by the full-depth removal of the existing pavement and replacing it with new PCC pavement. It includes complete removal of existing PCC pavement by saw-cutting and breaking, recompact subgrade, installing dowels, reinforcing steel as required, placing and finishing PCC pavement, installing joint sealant, and all necessary clean-up work and removal of all debris to an off-site location.

44.2 MATERIALS

44.2.1 PCC Pavement:

The PCC pavement shall be a rapid setting, high-early strength concrete which shall have the following minimum properties:

Compressive strength (ASTM C109)	3,000 psi at 1 day 5,000 psi at 7 days
Flexural strength (ASTM C78)	500 psi at 1 day 650 psi at 7 days

Conforming to the approved Job mix design, the PCC pavement shall contain at least 8.5 sacks of ASTM C150 Type II, III or V cement per cubic yard (Type is dependent on the site conditions as evaluated by the APM), contain 1-inch maximum aggregate produced by crushing rock and conforming to ASTM C33, and contain both an air-entraining admixture and a water reducing admixture. Maximum slump shall not exceed 3 inches, and air content shall be 6 percent by volume.

44.2.2 Dowels and Tie Bars:

Dowel bars shall be plain steel bars conforming to ASTM A615 and shall be free from burring or other deformation restricting slippage in the concrete. Before delivery to the construction site each dowel bar shall be epoxy coated per ASTM A1078, Type 1, with a coating thickness after curing greater than 10 mils.

Tie bars as indicated in the drawing if full depth repair is less than a full slab (bay) shall be deformed steel bars and conform to the requirements of ASTM A615. Tie bars designated as Grade 60 in ASTM A615 shall be used for construction requiring bent bars.

44.2.3 Epoxy Grout:

The epoxy grout shall be a high-modulus, high-strength, moisture insensitive, structural, epoxy paste adhesive, approved by APM, conforming to ASTM C881 and having the following minimum properties:

Compressive strength (ASTM D695)	8,000 psi at 1 day at 73° F
Tensile strength (ASTM D638)	4,500 psi at 14 days
Flexural strength (ASTM D790)	670 psi at 14 days

44.2.4 Joint Sealant:

See Specification A-3, Paragraph 3.2.2.

44.2.5 Backer Rod:

See Specification A-3, Paragraph 3.2.5.

44.2.6 Preformed Joint Filler:

See Specification A-3, Paragraph 3.2.7.

44.2.7 Reinforcing Steel:

The reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 40 or 60.

44.2.8 Bond Breaker:

The bond breaker shall be a liquid-type specifically manufactured for breaking the bond between concrete surfaces.

44.3 SUBMITTALS

Prior to beginning work, submit to APM for approval four sets of product data and installation procedures for PCC pavement, dowels, tie bars, reinforcing steel, epoxy grout, joint sealant, backer rod, preformed joint filler and bond breaker. For the PCC pavement, both detailed mix design and verifying test reports shall be submitted, two weeks in advance of scheduled repairs. Repair areas shall be marked in the field 24 hours in advance of scheduled repair. Do not begin work until written approvals are given by APM.

44.4 CONSTRUCTION METHODS

44.4.1 Concrete Removal:

Remove existing joint sealant and backing materials around periphery of removal area. Then sawcut for the full depth perimeter of the existing PCC pavement to be removed, using a diamond blade or equivalent. After the repair is isolated by full-depth saw cuts, additional full depth saw cuts within the repair area may be placed where necessary to facilitate removal of concrete. This additional saw cuts shall be placed approximately 1 1/2 feet from each perimeter saw cut. Breakup should begin in the center of the removal area within the inner saw cuts. Then break up concrete utilizing jackhammers and remove debris. Procedures used for removal must not spall or crack adjacent concrete or significantly disturb the base or subgrade.

44.4.2 Earthwork:

Remove subgrade materials (crushed aggregated base) to the specified depth. Utilizing hand-held pneumatic equipment, recompact subgrade for PCC pavement to 100% of maximum density per ASTM D1557. Provide at least two collection tests per 200 square feet of surface area. Submit test results to APM.

44.4.3 Dowels and Tie Bars Installation:

Except at edges along expansion joints, install steel dowels at mid-depth of vertical face of existing PCC pavement. Provide` dowel sizes as indicated. Install tie-bars as indicated for half slab repair. For half slab repair, install tie bar as indicated in the drawing to the existing slab. Dowels shall be placed as indicated and set 3 inches from existing, as practical.

Dowel sleeves or inserts are not permitted. Grout retention rings shall be fully circular metal or plastic devices capable of supporting the dowel until the grout hardens.

Drill holes for dowels using a carbide bit (not diamond). Thoroughly clean holes using compressed air which is oil and water free. Mix epoxy grout in accordance with manufacturer's specifications. Using a caulking gun having a large diameter tip and polyethylene tube extension, place epoxy grout to predetermined depth at back of holes. Then insert dowels and give at least one full turn during installation. Epoxy grout shall solidly fill holes up to the face of concrete. To prevent loss of epoxy grout, provide plastic retention disks (washer) to cover face of concrete. Using a template to temporarily hold dowels in position, locate dowels in a true horizontal and vertical alignment, perpendicular to the vertical face of the concrete, deviating not more than 1/8-inch per foot of length. Coat free end of dowels with a thin coat of lubricating grease. Apply bond breaker and preformed joint filler where indicated to existing vertical faces of concrete.

44.4.4 Placing and Finishing PCC Pavement:

Using truck mixed delivery for the PCC pavement, place at one end of area and work towards opposite end. PCC pavement shall be thoroughly consolidated using large hand-held vibrators. At least two of these vibrators shall be at the job site during placement. Level concrete by using a vibratory screed, and then finish to match adjacent exiting finishes using a broom or burlap drag.

44.4.5 Curing PCC Pavement:

Curing materials shall conform to one of the following specifications:

a. Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309, Type 2, Class A, or Class B.

b. White polyethylene film for curing concrete shall conform to the requirements of ASTM C171.

c. White burlap-polyethylene sheeting for curing concrete shall conform to the requirements of ASTM C171.

44.4.6 PCC Pavement Testing:

For each 200 square foot or less of repair, provide two compression tests for both 1 and 7 days cure times.

Submit test results to APM.

INSTALLATION OF SEALANT:

Sawcut joints to the indicated dimensions. Then thoroughly clean joints of all laitance and other foreign material by through water-blasting. Then the joints shall be blown out with compressed air. Then install joint sealant and backing per Specification A-1, Paragraph 1-4.2 and 1-4.3.

44.4.7 Clean-Up:

Any sealant spilled on the surface of the PCC pavement shall be removed immediately. Each day clean surface of the adjacent PCC pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

44.5 METHOD OF MEASUREMENT

Full depth PCC pavement repair by replacing concrete shall be measured by the square foot of area of the repairs, completed and accepted by APM.

44.6 BASIS OF PAYMENT

Payment for full depth PCC pavement repair by replacing concrete shall be made at the contract unit price per square foot of surface area of the repairs. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the full depth repair.

Concrete Unit Price shall be paid separately under P-501 Smooth Dowel Unit Price shall be paid separately under P-501

Reinforcing Steel Unit Price shall be paid separately under P-501

Payment will be made under:

Bid Item 72: Full Depth PCC Pavement Repair, per cubic yard

END OF SECTION A-4

45 A-5. CRACK REPAIR PCC PAVEMENT (NON-STRUCTURAL)

45.1 DESCRIPTION

The work of this Section consists of repairing cracks with a joint sealant in the top surface of either the existing PCC pavement or existing trench drain. It includes the removal of existing concrete, loose, or damaged sealant material where applicable, by saw cutting or routing, preparation of the cracks (water- blasting and air blowing crack cavity, preparation of the sealant material, installation of joint sealant and backing, and all necessary clean-up work and removal of all debris to an offsite location.

45.2 MATERIALS

45.2.1 Joint Sealant:

See Specification A-1, Paragraph 1.2.1.

45.2.2 Masking tape (High Temperature):

See Specification A-1, Paragraph 1.2.3.

45.3 SUBMITTALS

Prior to beginning work, submit to APM for approval four sets of product data and installation procedures for joint sealant, and masking tape (high temperature). Do not begin work until written approvals are given by APM.

45.4 CONSTRUCTION METHODS

45.4.1 Crack Preparation:

The existing cracks shall be cleaned of any debris or laitance by use of wire brushes or other tools as necessary. In some instances, sawing the cracks may be required. If sawing the cracks is required, immediately after sawing, the resulting slurry will be completely removed from the crack and adjacent area by flushing with a jet of water, and by use of other tools as necessary. The crack will be allowed sufficient time to dry prior to preparation of sealing. When sawing cracks, the joint reservoir width to depth of sealant ratio should be as close to 1:1 with a 1/2-inch minimum width recommended along their length by means of concrete sawing equipment to the appropriate depth. The widened portion shall be centered about the existing crack. The repair should be timed such that sawed-out cracks are not exposed for more than 24 hours before sealing. If the cracks get wet, the repair operation must stop until the cracks are completely dry. The cracks may be dried with a heat lance. Sawing is the preferred method for preparing cracks for sealing.

If spalling is present adjacent to a crack, the damaged area must be repaired by treating the crack the same as an expansion joint.

Immediately before sealing, the widened cracks shall be thoroughly cleaned of all laitance and other foreign material. Cleaning shall be accomplished by thorough water-blasting equipment or other methods with prior written approval from APM. Upon completion of water-blasting, the widened cracks (joints) shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps will be used

to prepare the cracks for sealing. The crack faces will be surface dry when the seal is applied. The surface of the installed sealant material will be 1/4-inch to 3/8-inch below the existing pavement surface.

Sandblasting is not allowed on the airfield.

45.4.2 Installation of Sealant:

See Specification A-1, Paragraph 1.4.2.

45.4.3 Clean-Up:

Any sealant spilled on the surface of the PCC pavement shall be removed immediately. Then clean surface of the adjacent PCC pavement by thorough sweeping and/or vacuuming of all debris to prevent injection by aircraft engines; remove debris to an off-site location.

45.5 METHOD OF MEASUREMENT

Cosmetic crack repair shall be measured by the linear foot of crack sealant repairs, completed and accepted by APM.

45.6 BASIS OF PAYMENT

Payment for cosmetic crack repairs shall be made at the contract unit price per linear foot of the repair. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the crack repair.

Payment will be made under:

Bid Item 73: Crack Repair PCC Pavement, per linear foot

END OF SECTION A-5

46 A-6. STRUCTURAL CRACK REPAIR PCC PAVEMENT

46.1 DESCRIPTION

The work of this Section consists of structurally repairing cracks on the existing PCC pavement with an injected structural epoxy. It includes surface preparation of cracks, setting injection ports and sealing top of cracks with sealer epoxy, sealing bottom of cracks, mixing and pressure injecting structural epoxy, removal of sealer epoxy, and all necessary clean-up work and removal of all debris to an off-site location.

46.2 MATERIALS

46.2.1 Sealer Epoxy:

The sealer epoxy shall be a high-modulus, high-strength, structural, very rapid curing, epoxy adhesive, approved equal by APM, conforming to ASTM C881 and having the following minimum properties:

Compressive strength (ASTM D695)	5,600 psi at 1 hour at 73°F
Tensile strength (ASTM D638)	3,300 psi at one (1) day

46.2.2 Structural Epoxy:

The structural epoxy shall be a high-modulus, low-viscosity, moisture insensitive, high-strength epoxy grouting adhesive approved by APM, conforming to ASTM C881 and having the following minimum properties:

Compressive strength (ASTM D695)	6,000 psi at 1 day at 73°F
Compressive strength (ASTM D695)	12,000 psi at 14 day at 73°F
Tensile strength (ASTM D638)	8,400 psi at 14 days
Flexural strength (ASTM D790)	12,000 psi at 14 days
Shear strength (ASTM D732)	5,100 psi at 14 days
Bond strength (ASTM C882)	4,000 psi at 2 days

46.3 SUBMITTALS

Prior to beginning work, submit to APM for approval four sets of product data and installation procedures for SEALER EPOXY and STRUCTURAL EPOXY. Also, submit proposed detail for sealing bottom of cracks and data on proposed automated pressure injection equipment. Do not begin work until written approvals are given by APM.

46.4 CONSTRUCTION METHODS

46.4.1 Crack Preparation:

Thoroughly water-blast top surface of crack to remove laitance, grease and fuels, curing compounds and other foreign materials. Cracks shall be free of standing water. Then the cracks shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps shall be used to prepare the cracks for sealing. Set injection ports at indicated spacing, and then seal both injection ports and top surface of crack with the sealer epoxy, in accordance with the instructions of the epoxy manufacturer. Allow sufficient time for curing.

46.4.2 Mixing Structural Epoxy:

Each component of the structural epoxy shall be pre-mixed. Then proportion components by volume as specified and mix together by using equipment approved by the manufacturer of the structural epoxy. Mix only that quantity that can be used within its pot life of 25 minutes. Follow all manufacturer's instructions carefully.

46.4.3 Installation of Structural Epoxy:

Utilize automated pressure injection equipment and operate it as approved by the manufacturer of the structural epoxy. Operate under steady pressure. Initially provide a seal at bottom of crack utilizing the structural epoxy. For cracks of larger width, this shall be achieved by providing a small amount of silica sand at bottom to entrap the structural epoxy. Then seal extreme ends of crack to act as a confining element.

Pressure-inject structural epoxy in accordance with the procedures of the epoxy manufacturer. Pressure injection shall be so accomplished that the crack is solidly filled with structural epoxy for its full length and depth. (Thoroughness of pressure injection will be subject to verification by APM by taking concrete cores along length of crack.)

46.4.4 Removal of Sealer Epoxy:

After the structural epoxy has cured for at least 2 hours, carefully remove injection ports and all sealer epoxy so that top surface matches adjacent surfaces of the existing PCC pavement.

46.4.5 Clean-Up:

Any sealant spilled on the surface of the PCC pavement shall be removed immediately. Then clean surface of the adjacent PCC pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

46.5 METHOD OF MEASUREMENT

Structural crack repair shall be measured by the linear foot of structural epoxy repair, completed and accepted by APM.

46.6 BASIS OF PAYMENT

Payment for structural crack repair shall be made at the contract unit price per linear foot of the repair. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing

of these materials, and for all labor, equipment, tools and incidentals necessary to complete the crack repair.

Payment will be made under:

Bid Item 74: Structural Crack Repair PCC Pavement, per linear foot

END OF SECTION A-6

47 A-7. TRENCH DRAIN SPALL REPAIR

47.1 DESCRIPTION

The work of this Section consists of repairing trench drain spalls on the existing PCC pavement with polymer concrete. It includes the removal of existing concrete for the trench drain by chipping and saw- cutting, installing headed stud anchors and reinforcing steel, water-blasting and priming concrete surfaces, placing and finishing polymer concrete, installing joint sealant, and all necessary clean- up work and removal of all debris to an off-site location.

47.2 MATERIALS

47.2.1 Polymer Concrete:

The polymer concrete shall be a rapid setting, polymer-modified, early strength concrete, or polyester polymer concrete approved by APM, having the following minimum properties:

Compressive strength (ASTM C109)	2,500 psi at 3 hours 6,000 psi at 7 days
Flexural strength (ASTM C78)	1200 psi at 7 days
Bond strength (ASTM C882)	2,000 psi at 1 day 2,500 psi at 7 days
Coefficient of Thermal Expansion (ASTM T336)	$<10 \times 10^{-6}$ in/in/°F
Length change, ASTM C157	28 Days Wet, +0.03% 28 Days Dry, -0.05%

Mixing water shall be clean and potable.

A pre-construction conference shall be held with the manufacturer's representative of the polymer concrete to discuss construction requirements and methodology. In addition, the manufacturer's representative shall be present during the first two days of application of the polymer concrete.

47.2.2 Preformed Joint Filler:

Preformed joint filler shall be a closed cell isomeric polymer foam compatible with the joint sealant, approved by APM. It shall be easy to cut and form. Preformed joint filler material properties shall meet requirements of ASTM D1752.

47.2.3 Reinforcing Steel:

The reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 40 or 60.

47.2.4 Headed Stud Anchors:

The headed stud anchors shall be weldable steel anchors as manufactured by Nelson Stud Welding Company, or approved equal by APM.

47.2.5 Bond Breaker:

The bond breaker shall be a liquid - type specifically manufactured for breaking the bond between concrete surfaces.

47.3 SUBMITTALS

Prior to beginning work, submit to APM for approval product data and installation procedures for polymer concrete, joint sealant, backer rod, preformed joint filler, caulking, reinforcing steel, headed anchor studs, and bond breaker.

Do not begin work until written approvals are given by APM.

47.4 CONSTRUCTION METHODS

47.4.1 Concrete Removal:

Remove existing trench drain covers and joint sealant as indicated. Then remove concrete by saw-cutting and chipping to the indicated limits. Special care shall be taken not to damage or cut existing reinforcing steel, headed anchor studs and trench frame (cut only where indicated). Carefully remove all existing concrete from these elements. Thoroughly clean exposed surfaces by water-blasting equipment or other methods with prior written approval from APM. Upon completion of cleaning, the surface will be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps will be used to prepare the surface.

47.4.2 Miscellaneous Preparatory Installations:

Install headed stud anchors as indicated. If equipment access is adequate, headed stud anchors shall be installed using Nelson Stud Welding Equipment, or if access is too limited, they shall be installed using conventional welding equipment by means of fillet welds using E70 series electrodes, low hydrogen type. Place reinforcing steel as indicated. Install temporary rigid plywood form for inside face. Secure trench frame to form, providing clearance for cover. Then install preformed joint filler as indicated using caulking.

47.4.3 Mixing Polymer Concrete:

Mixing shall be done in a mortar mixer in accordance with the manufacturer's specifications. The maximum amount of aggregate and water shall be closely monitored and never exceeded. Use minimum recommended water when possible. Mix to a uniform consistency with a maximum mixing time of 5 minutes, per manufacturer's specifications.

47.4.4 Application & Finishing Polymer Concrete:

The prepared surface shall be saturated surface dry with no standing water. Initially a thin coat of a polymer primer (consisting of a mortar from the polymer concrete) shall be thoroughly scrubbed into all faces of the cavity using a stiff bristled brush to a depth of 1/16 inch, filling all pores and voids. Place polymer concrete against sawcut edges of repair, working toward center of repair; do not place in layers. After filling cavity, thoroughly consolidate with small vibrator and then screed, per manufacturer's specifications. Screed from the center of patch out to the edges to push polymer concrete against edge interfaces. Polymer concrete shall be applied within 15 minutes after application of water to mix, per manufacturer's specifications.

Finish concrete with a broom or burlap-drag to produce a finish to match the adjacent existing surfaces. Tool edges when indicated.

47.4.5 Curing Polymer Concrete:

Repair materials shall be cured in accordance with the manufacturer's specifications and recommendations. The method needed to protect the repair material would depend upon temperature, humidity, and wind. Wet burlap or ponding are the preferred curing methods. Consult the manufacturer for appropriate curing schedule.

47.4.6 Installation of Sealant:

After a period of at least 1 day following placement of polymer concrete and completion of curing, carefully saw the preformed joint filler to the depth indicated. Immediately before sealing, the joints shall be thoroughly cleaned of all laitance and other foreign material by thorough water-blasting equipment or other methods with prior written approval from APM. Upon completion of cleaning, the joints will be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps will be used to prepare the joints for sealing. Then install joint sealant and backing per manufacturer's instructions.

47.4.7 Clean-Up:

Any debris on the surface of the PCC pavement shall be removed immediately. Then clean surface of the adjacent PCC pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

47.5 METHOD OF MEASUREMENT

Trench drain spall repairs by application of a polymer concrete to the dimensions indicated shall be measured by the cubic foot of polymer concrete required for each repair, completed and accepted by APM.

47.6 BASIS OF PAYMENT

Payment for trench drain spall repair by application of a polymer concrete shall be made at the contract unit price per cubic foot for each repair. The price shall be full compensation for overhead and profit, furnishing all

materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the spall repair.

Payment will be made under:

Bid Item 75: Polymer Modified Concrete for Trench Drain Repair, per cubic foot

END OF SECTION A-7

48 A-8. CRACK REPAIR – HMA PAVEMENTS

48.1 DESCRIPTION

The work of this Section consists of providing and installing a resilient and adhesive crack sealant, hot-applied, capable of effectively sealing cracks in the existing HMA pavements with crack sealant. It includes the removal of existing, loose, or damaged sealant material where applicable, preparation of the cracks, preparation of the sealant material, the complete installation of the sealant repair system, and all necessary clean-up work and removal of all debris to an off-site location. The selection of sealant material products will be based on climate conditions, past performance of products, and at the discretion of APM.

48.2 MATERIALS

48.2.1 Sealant:

The sealant material shall meet ASTM standards for the type of pavement and service for which the pavement is intended. The sealant material shall be a hot-applied, elastomeric, jet-fuel resistant type for HMA pavements conforming to the requirements of ASTM D6690. The sealant shall be packaged in a liquid state at delivery to site. It shall cure in 1 day for traffic application.

48.2.2 Alternate for Crack Sealant:

The use of a silicone sealant is restricted to edge joints between HMA and PCC pavements only. Silicone should not be used to seal HMA pavement to HMA pavement joints. The sealant shall be a one-part silicone material formulation capable of being applied with a pressure applicator. The sealant shall be a self-leveling, nonacid producing and cure on exposure to air. The sealant shall be a low modulus type, as stated by the manufacturer, meet the following requirements of ASTM D5893 and is specifically approved by APM.

48.2.3 Backer Rod:

The backer rod material shall provide a bond - break for the joint sealant, and it shall be a closed cell polyethylene backer rod material, cross linked for hot-applied sealants and capable of withstanding temperatures of 395° F for 30 minutes, and conforming to the requirements of ASTM D5249. The backer rod is a compressible, non-shrinking, nonabsorptive material whose melting point should be higher than the pouring temperature of the sealant. The backer rod shall be approximately 25 percent wider in diameter than the nominal width of the crack. The backer rod shall be placed to a depth that will provide a shape factor (width to depth of sealant ratio) of approximately 1. Backer rod shall be used when depth of reservoir is greater than 3/4 inch.

48.2.4 Tack Coat:

Tack coat shall conform to the requirements of ASTM D 2397, Type RS-1 or RS-1h.

48.2.5 HMA Patch Materials:

See Specification 11, as required.

48.3 SUBMITTALS

Prior to beginning work, submit to APM for approval four sets of product data and installation procedures for sealant, backer rod, tack coat and HMA patch materials. Do not begin work until written approvals of repair areas and repair types are given by APM.

48.4 CONSTRUCTION METHODS

48.4.1 Preparation of Cracks:

Remove existing loose or damaged HMA concrete, sealant and backing sealant material where applicable. Crack preparation procedures depend on crack size, and existing HMA layer thickness.

Type 1. Crack widths from $\frac{1}{4}$ to $\frac{3}{4}$ inch: cracks shall be widened to a nominal width of $\frac{1}{8}$ inch greater than the existing nominal or average width. Widening the cracks $\frac{1}{8}$ inch will help eliminate the potential for raveling of the pavement along the edges of the crack and will provide a sealant reservoir that has vertical faces. The depth of the routed crack should be approximately $\frac{3}{4}$ inch.

Crack widening shall be done by means of concrete router or concrete saw. A vertical spindle router with a diamond bit is recommended to minimize damage to the asphalt pavement; however, an impact router may be used if it is equipped with carbide-tipped vertical-sided bits. Impact routers that are not equipped with carbide-tipped bits or those equipped with V-shaped bits shall not be used. When using a vertical spindle router, the router bit shall be belt-driven to help prevent injury to the operator and damage to the pavement if the bit jams in the crack. If damage to the pavement is observed, work shall be discontinued until corrective action is taken. Such corrective action may require replacing worn router bits, changing operators, or replacing the equipment completely.

Concrete saws may be used in place of a router if the blade has a water-cooled diamond blade with diameter of 6 inches or less. If a saw is used to widen the crack, a high-pressure water stream can be used to remove the debris created by the saw.

Type 2. Crack widths from $\frac{3}{4}$ to 2 inches, with existing pavement thickness less than 5 inches: Cracks shall not be widened by use of router/sawing. For pavements 5 inches or greater in depth, use backer rod to create a reservoir. Type 3. Crack widths greater than 2 inches, with existing pavement thickness greater than 5 inches: Cracks shall not be widened by use of router/sawing. For pavements 5 inches or greater in depth, construct a partial depth repair per Specification 10. When sawing/routing cracks, the reservoir ratio should be 1:1 with a $\frac{1}{2}$ -inch minimum width recommended.

Immediately before sealing, the surfaces shall be thoroughly cleaned of all laitance and other foreign material. Cleaning shall be accomplished by thorough and careful application of HCA heat lance. Upon completion of HCA heat lance application, the exposed surfaces shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps will be used to prepare the cracks for sealing.

48.4.2 Installation of Sealant:

The cracks shall be inspected and approved by APM immediately prior to sealing. Inspections shall include crack reservoir preparation, backer rod size and placement when necessary, and cleanliness of the exposed surface.

When necessary, installation of backer rod shall be continuous with no void spaces at lapped splices and intersections. Sealant shall be applied uniformly solid from bottom to top of crack, and it shall be installed without the formation of entrapped air or voids. The surface of the installed sealant material will be 1/4-inch to 3/8-inch below the existing pavement surface. A squeegee may be used to remove excess sealant from the pavement surface when a crack is overfilled.

The heating kettle for the hot-applied sealant shall be an indirect heating type, constructed as a double boiler. A positive temperature control and mechanical agitation shall be provided. The joint sealant shall not be heated to more than 200F below the safe heating temperature. The safe heating temperature can be obtained from the manufacturer's shipping container. A direct connecting pressure type extruding device with nozzle shaped for insertion into the joint shall be provided.

Any cracks that are not sealed the same day they are prepared should be blown out with compressed air before the sealing operation continues. If rain delays the sealing operation, the cracks should be allowed to dry and shall be cleaned with HCA heat lance and compressed air free of oil and water.

48.4.3 Clean-Up:

Any sealant spilled on the surface of the HMA pavement shall be removed immediately. Then clean surface of the adjacent HMA pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

48.5 METHOD OF MEASUREMENT

Crack repairs shall be measured by the linear foot of crack repair, of the type specified, measured in place, completed and accepted by APM.

48.6 BASIS OF PAYMENT

Payment for Crack Repair shall be made at the contract unit price per linear foot of repair placed. The price shall be full compensation for cleaning, and filling the prepared crack with hot applied sealant, for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the crack repair.

Payment will be made under:

Bid Item 76:	Crack Repair HMA Pavement, Type 1, per linear foot
Bid Item 77:	Crack Repair HMA Pavement, Type 2, per linear foot
Bid Item 78:	Crack Repair HMA Pavement, Type 3, per linear foot

END OF SECTION A-8

49 A-9. PARTIAL DEPTH PATCH REPAIR OF HMA PAVEMENT

49.1 DESCRIPTION

The work of this section consists of removal and replacement of distressed, existing HMA pavement to a required depth, approved by APM. It includes the removal of existing distressed HMA by saw cutting and/or chipping and/or milling, the preparation of exposed surface, the preparation of patch materials, the installation of patch materials, and all necessary clean-up work and removal of all debris to an off-site location. The patch material will be composed of mineral aggregate, mineral fillers and bituminous binder material mixed in a central mixing plant and generally conforming to specification P-401. Distress types observed and proposed repair depth must be submitted and approved by APM.

49.2 MATERIALS

49.2.1 Aggregates:

Aggregates shall be clean and free from decomposed materials, organic material and other deleterious substances. Aggregates shall consist of crushed stone, crushed gravel, or crushed slag with or without natural sand or other inert finely divided mineral aggregate. The fine and coarse aggregate properties should conform to the requirements in specification P- 401-1 and approved by APM:

49.2.2 Mineral Filler:

If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242.

49.2.3 Bituminous Binder:

Asphalt binder to be mixed with aggregate shall be a steam- refined paving asphalt in conformance with the provisions in P-401 and shall be of the grade designated in the special provisions or as approved by APM.

49.2.4 Tack Coat:

Tack coat shall conform to the requirements of ASTM D3628, or P-603 for the rapid-setting type, and approved by APM.

49.2.5 Pavement Reinforcing Fabric:

Pavement reinforcing fabric shall be 100 percent polypropylene staple fiber fabric material, needle-punched, thermally bonded on one side, and conform to the following:

Specification	Requirement
Weight, grams per square meter ASTM Designation: D 5261	140
Grab tensile strength (25-mm grip), kilonewtons, min. in each direction ASTM Designation: D 4632	0.45
elongation at break, percent min. ASTM Designation: D 4632	50
Asphalt retention by fabric, grams per square meter. (Residual Minimum) ASTM Designation: D 6140	900

Note: Weight, grab, elongation and asphalt retention are based on Minimum

Average Roll Value (MARV)

49.2.6 Composition and Compaction Testing of Materials:

The HMA materials shall be considered acceptable for use where plant inspection is maintained by the California DOT and production samples are taken on a regular basis for conformance with California DOT standards based on the approved job mixture formula for maximum size of ¾-inch.

49.3 SUBMITTALS

Prior to beginning work, submit to APM for approval product data and installation procedures for aggregates, bituminous binder, job mix formula, tack coat, pavement reinforcing fabric, and sealant. Do not begin work until written approvals are given by APM.

49.4 CONSTRUCTION METHODS

49.4.1 Surface Preparation:

Mark the repair area. A string line or straight edge should be used to mark straight lines around the repair area. The lines shall be marked with spray paint so they are easily visible when sawing the pavement. Repair areas shall be marked to form a square or rectangle with at least 12 inches beyond the distressed area.

Saw cut the repair area, with concrete saw equipped with a diamond-tip or abrasive blade. Saw cuts shall overlap so that a vertical and square corner is formed. Since diamond-tip blades usually require water, the repair area should be completely dry before it is repaired. However, there are some types of diamond-tip blades designed

to dry cut asphalt pavements. The abrasive saw blade has advantages of lower cost and does not require water when sawing.

Remove existing deteriorated concrete by milling (for larger repair area) or using jackhammer (for smaller repair area). Pneumatic hammer weight for chipping shall not exceed 30 pounds (to protect adjacent HMA). Make additional saw cuts as needed to speed removal. After milling or jack hammering, remove and discard the loose materials.

49.4.2 Apply Tack Coat:

Tack coat shall be applied at the rate of 0.06 to 0.10 gallons per square yard.

49.4.3 Install Pavement Reinforcing Fabric:

Place fabric per manufacturer's recommendations.

49.4.4 Installation of HMA Patch:

The material shall be placed and compacted in one lift (maximum 3-inch thickness). In order for the patch to be level with the surrounding pavement, the patch area shall be overfilled (by approximately 40%, depending on the field test of the mix used) to allow for compaction. The type of compactor shall be compatible and appropriate with the patch size. For small patch areas, a vibratory plate tamper can be used. Larger areas require the use of a steel-wheel roller. Using the appropriate compactor, the patch shall be compacted, starting from the edges, following by the center of the patch area, following direction of traffic. Upon completion of compaction, the patch shall be level or no higher than 1/8 inch above the surrounding patch surface.

49.4.5 Saw and Seal Path Boundary:

After completing the patch, the final step is to saw cut and seal the edges with an appropriate sealant material.

49.4.6 Clean-Up:

Clean surface of the adjacent HMA pavements by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

49.5 METHOD OF MEASUREMENT

The partial depth HMA repair by removal and replacement of HMA layer shall be measured by the square feet of surface area of the area repairs and thickness to determine the appropriate quantities, completed and accepted by APM. Use of pavement reinforcing fabric will be as approved by APM prior to placement.

49.6 BASIS OF PAYMENT

Payment for partial depth HMA repair by removal and replacement of HMA layers shall be made at the contract unit price per unit rates for the materials required for the repairs. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the partial depth HMA repair.

Payment will be made under:

- Bid Item 47: Plant Mix Bituminous Pavements, P-401 for Airfield Pavements, up to 50
TN, per ton
- Bid Item 35: Milling 1" - 4" Asphalt Concrete Pavements, per cubic yard
- Bid Item 7: Pavement Reinforcing Fabric - per square yard
- Bid Item 79: Saw Cutting - Asphalt Pavement "1 - 4" Thick, per linear foot

END OF SECTION A-9

50 A-10. FULL DEPTH PATCH REPAIR OF HMA PAVEMENT

50.1 DESCRIPTION

The work of this Section consists of removal and replacement of distressed, existing HMA pavement and base layer, to a required depth, approved by APM. It includes the removal of existing distressed HMA concrete by saw cutting and/or chipping and/or milling, removal of base layer, the preparation of exposed surface, the preparation of patch materials, the installation of patch materials, and all necessary removals and clean - up work and removal of all debris to an off - site location. The patch material will be composed of mineral aggregate, mineral fillers and bituminous binder material mixed in a central mixing plant and generally conforming to specification P-401. Distress types observed and proposed repair depth must be submitted and approved by APM.

50.2 MATERIALS

50.2.1 Aggregates:

Aggregates shall be clean and free from decomposed materials, organic material and other deleterious substances. Aggregates shall consist of crushed stone, crushed gravel, or crushed slag with or without natural sand or other inert finely divided mineral aggregate. The fine and coarse aggregate properties should conform to the requirements in specification 401 and approved by APM.

50.2.2 Mineral Filler:

If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242.

50.2.3 Bituminous Binder:

Asphalt binder to be mixed with aggregate shall be a steam- refined paving asphalt in conformance with the provisions in Section P-401 and shall be of the grade designated in the Section P-401 or as approved by APM.

50.2.4 Tack Coat:

Tack coat shall conform to the requirements of ASTM D3628, or Section P-603, Asphaltic Emulsions, for the rapid-setting type, and approved by APM.

50.2.5 Composition and Compaction Testing of Materials:

The HMA materials shall be considered acceptable for use where plant inspection is maintained by the California DOT and production samples are taken on a regular basis for conformance with California DOT standards based on the approved job mixture formula for maximum size of 3/4-inch.

50.3 SUBMITTALS

Prior to beginning work, submit to APM for approval product data, asphalt concrete job mix formula with required test reports, certificates of compliance for aggregates and asphalt binder and installation procedures

for aggregates, bituminous binder, job mix formula, tack coat, and sealant. Do not begin work until written approvals are given by APM.

50.4 CONSTRUCTION METHODS

50.4.1 Surface Preparation:

Mark the repair area. A string line or straight edge should be used to mark straight lines around the repair area. The lines shall be marked with spray paint so they are easily visible when sawing the pavement. Repair areas shall be marked to form a square or rectangle with at least 12 inches beyond the distressed area.

Saw cut the repair area, with concrete saw equipped with a diamond-tip or abrasive blade. Saw cuts shall overlap so that a vertical and square corner is formed. Since diamond-tip blades usually require water, the repair area should be completely dry before it is repaired. However, there are some types of diamond-tip blades designed to dry cut asphalt pavements. The abrasive saw blade has advantages of lower cost and does not require water when sawing.

Remove existing deteriorated concrete by milling (for larger repair area) or using jackhammer (for smaller repair area). Pneumatic hammer weight for chipping shall not exceed 30 pounds (to protect adjacent concrete). Make additional saw cuts as needed to speed removal. After milling or jack hammering, remove and discard the loose materials.

50.4.2 Apply Tack Coat:

Tack coat shall be applied at the rate of 0.06 to 0.10 gallons per square yard.

50.4.3 Installation of HMA Patch:

The material shall be placed and compacted in multiple 2-inch lifts. In order for the patch to be level with the surrounding pavement, the patch area shall be overfilled (by approximately 40%, depending on the field test of the mix used) to allow for compaction. The type of compactor shall be compatible and appropriate with the patch size. For small patch areas, a vibratory plate tamper can be used. Larger areas require the use of a steel-wheel roller. Using the appropriate compactor, the patch shall be compacted, starting from the edges, following by the center of the patch area, following direction of traffic. Upon completion of compaction, the patch shall be level or no higher than 1/8 inch above the surrounding patch surface.

50.4.4 Saw and Seal Patch Boundary:

After completing the patch, the final step is to saw cut and seal the edges with an appropriate sealant material.

50.4.5 Clean-Up:

Clean surface of the adjacent HMA pavements by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

50.5 METHOD OF MEASUREMENT

The full depth HMA repair by removal and replacement of HMA layer and base shall be measured by the square feet of repair surface areas and the thicknesses and weights of materials as appropriate, completed and accepted by APM.

50.6 BASIS OF PAYMENT

Payment for full depth HMA repair by removal and replacement of HMA layers and base shall be made at the contract unit prices necessary to complete the patch. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the full depth HMA Repair.

Payment will be made under:

Bid Item 45:	Crushed Aggregate Base Course, P-209 for Airfield Pavements, per cubic yard
Bid Item 47:	Plant Mix Bituminous Pavements, P-401 for Airfield Pavements, up to 50 TN, per ton
Bid Item 35:	Milling 1" - 4" Asphalt Concrete Pavements, per cubic yard
Bid Item 79:	Saw Cutting - Asphalt Pavement 1" - 4" Thick, per linear foot

END OF SECTION A-10

51A-11. BOLLARDS

51.1 DESCRIPTION

The work of this Section consists of installation of concrete filled steel pipe bollards at locations as directed by APM.

51.2 MATERIALS

51.2.1 Steel Pipe:

Bollards are constructed of structural steel pipe filled with concrete. The steel pipe should have an outside diameter of 4-inch or 6-inch as indicated, 1/2-inch thick wall, and be a minimum of 7-ft in length. The bollards should extend 4 ft above the ground level from a footing with minimum width and length of 2 ft by 2 ft. The bollards should be positioned as directed by APM.

51.2.2 Concrete:

The footing concrete shall be a normal setting approved by APM, having the following minimum properties:

Compressive strength (ASTM C109) - 4,000 psi at 28 days

Mixing water shall be clean and potable.

Concrete for the pipe fill shall have a finer aggregate gradation, 3/8 inch maximum to ensure the mix flows and completely fills the embedded pipe. Compressive strength shall be a minimum of 3,000 psi at 28 days.

51.3 SUBMITTALS

Prior to beginning work, submit to APM for approval four sets of product data and installation procedures for the bollards. Commercially available bollard systems may be submitted for approval. Do not begin work until written approvals are given by APM.

51.4 CONSTRUCTION METHODS

Contractor will excavate, form the footing, position the unfilled steel pipe, place the footing concrete and when the footing concrete has been in place for no less than 24 hours backfill the footing excavation and restore the surface. Once the surface has been restored, the concrete fill shall be installed in the pipe.

51.4.1 Clean-Up:

Any debris on the surface surrounding the bollard shall be removed immediately. Then clean surface of the adjacent pavement by thorough sweeping and/or vacuuming of all debris to prevent ingestion by aircraft engines; remove debris to an off-site location.

51.5 METHOD OF MEASUREMENT

Bollards shall be measured by the unit, completed and accepted by APM.

51.6 BASIS OF PAYMENT

Payment for bollards shall be made at the contract unit price for each. The price shall be full compensation for overhead and profit, furnishing all materials, all preparation, delivering, placing of these materials, and for all labor, equipment, tools and incidentals necessary to complete the installation.

Payment will be made under:

- Bid Item 80: Bollard – 4-Inch Diameter, per each
- Bid Item 81: Bollard – 6-Inch Diameter, per each

END OF SECTION A-11

52 BASIC ELECTRICAL REQUIREMENTS

52.1 DESCRIPTION

52.1.1 General Requirements:

The work includes general administrative and procedural requirements for electrical work. The following administrative and procedural requirements are included in this Section to supplement the requirements specified in the General Provisions.

52.1.2 Submittals:

Submittals shall consist of detailed Shop Drawings, Specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on and those optional accessories which are included and those which are Excluded.

The Contractor shall submit detailed Drawings of all electrical equipment rooms and closets if the proposed installation layout differs from the construction documents. Revised electrical equipment layouts must be approved prior to release of order for equipment and prior to installation.

All resubmittals shall include a cover letter that lists the action taken and revisions made to each Drawing and equipment data sheet in response to Submittal Review Comments.

52.2 MATERIALS

52.2.1

Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.

When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.

Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:

1. California Electric Code (CEC).
2. California Building Code (CBC).
3. California Fire Code (CFC).
4. California Mechanical Code (CMC)

Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:

ACI American Concrete Institute

ANSI American National Standards Institute

ASTM American Society for Testing Materials

CBM Certified Ballast Manufacturers

ETL Electrical Testing Laboratories

FS Federal Specification

IEEE Institute of Electrical and Electronics Engineers, Inc.

IPCEA Insulated Power Cable Engineer Association

NEMA National Electrical Manufacturer's Association

UL Underwriters' Laboratories

NETA InterNational Electrical Testing Association

All base materials shall be ASTM and/or ANSI standards. All electrical apparatus furnished under this Section shall conform to NEMA standards and the NEC and bear the UL or ETL label where such label is applicable.

52.3 CONSTRUCTION METHODS

52.3.1 ROUGH-IN

Contractor shall verify lines, levels and dimensions indicated on the Drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.

Verify final locations for rough-ins with field measurements and with the requirements for the actual equipment to be connected.

52.3.2 ELECTRICAL INSTALLATION

Preparation, sequencing, handling and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Comply with the following requirements:

- 52.3.2.1 Shop Drawings prepared by Manufacturer.
- 52.3.2.2 Verify all dimensions by field measurements.
- 52.3.2.3 Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
- 52.3.2.4 Sequence, coordinate and integrate installations of electrical materials and equipment for efficient flow of the Work.
- 52.3.2.5 Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
- 52.3.2.6 Install systems, materials and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
- 52.3.2.7 Install systems, materials and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
- 52.3.2.8 Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- 52.3.2.9 Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.
- 52.3.2.10 Conform to the National Electrical Contractor's Association "Standard of Installation" for general installation practice

52.3.3 CUTTING, PATCHING, PAINTING AND SEALING

Structural members shall in no case be drilled, bored or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.

Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

Application of joint sealers:

52.3.3.1 General: Comply with joint sealer Manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.

52.3.3.2 Installation of fire-stopping sealant: Install sealant, including forming, packing and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire-stops and fire-resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

52.3.4 CLEANING

Prior to energizing of electrical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.

Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all electrical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt and debris.

Touch-up paint any marks, blemishes or other finish damage suffered during installation.

52.4 BASIS OF PAYMENT

52.4.1

Payment shall be made at contract unit price necessary to complete the work. This price shall be full compensation for overhead and profit, furnishing all materials, all preparation, and for all labor, equipment, tools and incidentals necessary to complete the work.

END OF SPECIFICATION

53 BUILDING WIRE AND CABLE

53.1 DESCRIPTION

53.1.1 General Requirements:

The section covers requirements for building wire, cable, and wiring connections and terminations. Work specified herein with that specified elsewhere to produce a complete installation.

53.1.2 Submittals:

Submittals shall consist of the following items:

- 53.1.2.1 Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
- 53.1.2.2 Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
- 53.1.2.3 Submit Manufacturer's installation instructions.
- 53.1.2.4 Final test results.

53.2 MATERIALS

53.2.1 MANUFACTURERS

Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

53.2.1.1 Building wire:

53.2.1.1.1 America Insulated Wire Corp.

53.2.1.1.2 Rome Cable.

53.2.1.1.3 Southwire Company.

53.2.1.1.4 Okonite

53.2.1.1.5 General Cable

53.2.1.2 Flexible Cords and Cables:

53.2.1.2.1 Carol Cable Company.

53.2.1.2.2 PWC Corp.

53.2.1.2.3 ITT Royal Electric.

53.2.1.3 Wiring connectors and terminations:

53.2.1.3.1 3M Company.

53.2.1.3.2 Ideal.

53.2.1.3.3 Blackburn-Holub.

53.2.1.3.4 Burndy.

53.2.1.3.5 Thomas & Betts Corp.

53.2.1.3.6 Beau Barrier.

53.2.1.3.7 Polaris

53.2.1.3.8 ILSCO

53.2.1.3.9 Molex

53.2.2 BUILDING WIRE

53.2.2.1 Conductor material: Provide annealed copper for all wire, conductor and cable, unless otherwise indicated. Control circuit wire shall be stranded.

53.2.2.2 Insulation material:

53.2.2.2.1 All insulated wire, conductor and cable shall be 600 volt rated unless otherwise noted on the Drawings.

53.2.2.2.2 Thermoplastic-insulated building wire: NEMA WC 5.

53.2.2.2.3 Rubber-insulated building wire: NEMA WC 3.

53.2.2.2.4 Feeders and branch circuits larger than 6 AWG: Type dual rated THHN/THWN.

53.2.2.2.5 Feeders and branch circuits 6 AWG and smaller: Type dual rated THHN/THWN.

53.2.2.2.6 Underground Locations: Type XHHW/XHHN or THHN/THWN-2.

53.2.2.2.7 Control Circuits: Type dual rated THHN/THWN.

53.2.2.2.8 Identify system conductors as to voltage and phase connections by means of color-impregnated insulation.

53.2.3 WIRING CONNECTIONS AND TERMINATIONS

53.2.3.1 Bolted pressure connectors: Provide wide range-taking connectors with cast bronze compression bolts, designed for parallel taps, tees, crosses or end-to-end connections.

53.2.3.2 Electrical spring wire connectors:

53.2.3.2.1 Provide multi-part construction incorporating a non-restricted, zinc coated square cross-section steel spring enclosed in a steel sheet with an outer jacket of plastic and insulating skirt.

53.2.3.2.2 Self-striping pigtail and tap U-contact connectors shall not be used.

53.2.3.3 Compression type terminating lugs:

53.2.3.3.1 Provide tin-plated copper high-compression type lugs for installation with hand or hydraulically operated circumference-crimping tools and dies as stipulated by the lug Manufacturer or as indicated on Drawings. Notch or single point type crimping is NOT acceptable.

53.2.3.3.2 Two hole, long barrel lugs shall be provided for size (4/0) and larger wire where terminated to bus bars. Use minimum of three crimps per lug, on sizes where possible.

53.2.3.4 Splicing and insulating tape: Provide black, ultraviolet proof, self-extinguishing, 7 mil thick vinyl general purpose electrical tape with a dielectric strength of 10,000 volts suitable for temperatures from minus 18 degrees C to 105 degrees C. Federal Spec. HH-I-595, Scotch 33+ or equal minimum.

53.2.3.5 Insulating putty:

53.2.3.5.1 Provide pads or rolls of non-corrosive, self-fusing, one-eighth inch thick rubber putty with PVC backing sheet. Scotch vinyl mastic pads and roll or equal.

53.2.3.5.2 Use putty suitable for temperatures from minus 17.8 degrees C to 37.8 degrees C with a dielectric strength of 570-volts/mil minimum.

53.2.3.6 Insulating resin:

53.2.3.6.1 Provide two-part liquid epoxy resin with resin and catalyst in pre-measured, sealed mixing pouch. Scotchcast 4 or equal for wet or underground vaults, boxes, etc. splices or terminations.

53.2.3.6.2 Use resin with a set up time of approximately 30 minutes at 21.1 degrees C and with thermal and dielectric properties equal to the insulating properties of the cables immersed in the resin.

53.2.3.7 Terminal strips:

53.2.3.7.1 Provide box type terminal strips in the required quantity plus 25% spare. Install in continuous rows in terminal cabinets.

53.2.3.7.2 Use the box type terminal strips with barrier open backs and with ampere ratings as required.

53.2.3.7.3 Identify all terminals with numbering sequence being used for a particular system.

53.2.3.8 Crimp type connectors:

- 53.2.3.8.1 Provide insulated fork or ring crimp terminals with tinned electrolytic copper brazed barrel with funnel wire entry and insulation support
- 53.2.3.8.2 Fasten crimp type connectors or terminals using a crimping tool recommended by the connector Manufacturer.
- 53.2.3.8.3 Provide insulated overlap splices with tinned seamless electrolytic copper barrel with funnel wire entry and insulation support.
- 53.2.3.8.4 Provide insulated butt splices with tinned seamless electrolytic copper barrel with center stop, funnel wire entry and insulation support.

53.2.3.9 Cable ties: Provide harnessing and point-to-point wire bundling with nylon cable ties. All cable ties shall be installed in a manner to not leave sharp edges.

53.2.3.10 Wire lubricating compound:

- 53.2.3.10.1 UL listed for the wire insulation and conduit type and shall not harden or become adhesive.
- 53.2.3.10.2 Shall not be used on wire for isolated type electrical power systems.

53.2.3.11 Bolt termination hardware:

- 53.2.3.11.1 Bolts shall be plated, medium carbon steel heat-treated, quenched and tempered equal to ASTM A-325 or SAE grade 5; or silicon bronze alloy ASTM B-9954 Type B.
- 53.2.3.11.2 Nuts shall be heavy semi-finished hexagon, conforming to ANSI B18.2.2, threads to be unified coarse series (UNC), class 2B steel or silicon bronze alloy.
- 53.2.3.11.3 Flat washers shall be steel or silicon bronze, Type A plain standard wide series, confirming to ANSI B27.2. SAE or narrow series shall not be used.
- 53.2.3.11.4 Belleville conical spring washers shall be hardened steel, cadmium plated or silicon bronze.
- 53.2.3.11.5 Each bolt connecting lug(s) to a terminal or bus shall not carry current exceeding the following Manufacturer's recommendations.

- 53.2.3.12 Mechanical Lugs: UL-listed cable termination lugs for conductors no. 8 AWG and larger up to #1/0 shall be made of high conductivity and corrosion-resistant material, electro-tin plated, listed for use with copper conductors only, rated for 600V. Lugs shall be color-coded by size, indent type, long barrel with chamfered entry, 2-hole, compression type.

53.3 CONSTRUCTION METHODS

53.3.1 EXAMINATION

- 53.3.1.1 Contractor shall thoroughly examine Project site conditions for acceptance of wire and cable installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

53.3.2 APPLICATION

- 53.3.2.1 All wire, conductor and cable with their respective connectors, fittings and supports shall be UL listed for the installed application and ambient condition.
- 53.3.2.2 Feeders and branch circuits in wet and dry locations shall be rated 75 degree C or better.
- 53.3.2.3 Feeders and branch circuits in boiler and mechanical rooms shall be rated 90 degree C.
- 53.3.2.4 Minimum conductor size:
- 53.3.2.5 Provide minimum AWG #12 for all power and lighting branch circuits.
- 53.3.2.6 Provide minimum AWG #14 for all line voltage signal and control wiring unless otherwise indicated
- 53.3.2.7 Color coding:

1. For 120/208 volt, 3 phase, 4 wire systems:

- a. Phase A – Black
- b. Phase B – Red
- c. Phase C – Blue
- d. Neutral – White
- e. Ground – Green

2. For 277/480 volt, 3 phase, 4 wire systems:

- a. Phase A – Brown

- b. Phase B – Orange
- c. Phase C – Yellow
- d. Neutral – Grey
- e. Ground – Green

- 53.3.2.8 Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes or handholes. Group and bundle each neutral with its associated phase conductor where more than one neutral is present in a conduit.
- 53.3.2.9 Install cable supports for all vertical feeders in accordance with the NEC Article 300. Provide split wedge type fittings, which firmly clamp each individual cable and tighten due to cable weight.
- 53.3.2.10 Neatly form, train and tie the cables in individual circuits. For panelboards, cabinets, wireways, switches and equipment assemblies.
- 53.3.2.11 Seal cable or wire, entering a building from underground between the wire or cable and conduit, where it exits the conduit, with a non-hardening approved compound, i.e. duct seal or equal.
- 53.3.2.12 Provide UL-listed factory-fabricated, solderless metal connectors of size, ampacity rating, material, type and class for applications and for services indicated. Use connectors with temperature ratings equal to or greater than the wires that are being terminated.
- 53.3.2.13 Stranded wire shall be terminated using fitting, lugs or devices listed for the application. However, in no case shall stranded wire be terminated solely by wrapping it around a screw or bolt.
- 53.3.2.14 Flexible cords and cables supplied, as part of a pre-manufacturer fixture or unit assembly shall be installed according to Manufacturers published installation instructions.
- 53.3.2.15 Provide a dedicated neutral for every circuit

53.3.3 WIRING INSTALLATION IN RACEWAYS

- 53.3.3.1 Pull all conductors into a raceway at the same time. Exercise care in pulling conductors so that insulation is not damaged. Use UL listed, non-petroleum base and insulating type pulling compound as needed.
- 53.3.3.2 Completely mandrel all underground concrete encased conduits prior to installing conductors.
- 53.3.3.3 Completely and thoroughly swab underground concrete encased conduits before installing conductors.
- 53.3.3.4 Do not use block and tackle, power driven winch or other mechanical means for pulling conductors of size smaller than AWG #1.
- 53.3.3.5 Wire pulling:
 - 53.3.3.5.1 Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.
 - 53.3.3.5.2 Use rope made of nonmetallic material for pulling feeders.
 - 53.3.3.5.3 Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors.
 - 53.3.3.5.4 Pull together multiple conductors or cables in a single conduit.
- 53.3.3.6 Install and test all cables in accordance with Manufacturer's instructions and warranty.

53.3.4 INSTALLATION IN MANHOLES

- 53.3.4.1 Install and support cables in manhole on the steel racks with porcelain or equal insulators, unless otherwise noted. Train the cables around the manhole walls, but do not bend to a radius less than six times the overall cable diameter

53.3.5 WIRE SPLICES, JOINTS AND TERMINATION

- 53.3.5.1 Join and terminate wire, conductors and cables in accordance with UL 486A, C, NEC and Manufacturer's instructions.
- 53.3.5.2 Thoroughly clean wires before installing lugs and connectors.
- 53.3.5.3 Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- 53.3.5.4 Splices and terminations shall be made mechanically and electrically secure
- 53.3.5.5 Where it's determined that unsatisfactory splice or terminations have been installed, remove the devices and install approved devices at no addition cost.
- 53.3.5.6 Terminate wires in Terminal Cabinets, relay and contactor panels, etc. using terminal strip connectors.
- 53.3.5.7 Insulate spare conductors with electrical tape and leave sufficient length to terminate anywhere in the panel or cabinet.
- 53.3.5.8 Install cable ties and maintain harnessing.
- 53.3.5.9 Encapsulate splices in underground, pullboxes using specified insulating resin kits. Make all splices watertight for exterior equipment and equipment in pump rooms.

53.3.6 IDENTIFICATION

- 53.3.6.1 Securely tag all branch circuits. Mark conductors with specified vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each conductor with the corresponding circuit number.
- 53.3.6.2 Color code conductors using specified colored insulation.
- 53.3.6.3 Provide all terminal strips with each individual terminal identified using specified vinyl markers.

53.4 BASIS OF PAYMENT

53.4.1

Payment shall be made at contract unit price necessary to complete the work. This price shall be full compensation for overhead and profit, furnishing all materials, all preparation, and for all labor, equipment, tools and incidentals necessary to complete the work.

END OF SPECIFICATION

54 CONDUIT

54.1 DESCRIPTION

54.1.1 General Requirements:

The work includes Rigid steel conduit and fittings, PVC insulated rigid steel conduit and fittings, Intermediate metal conduit and fittings, Electrical metallic tubing and fittings, Rigid non-metallic conduit and fittings, Flexible metallic conduit and fittings. Liquid tight flexible metallic conduit and fittings, and Miscellaneous conduit fittings and products.

54.1.2 Submittals:

Submittals shall consist of Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards and clearly mark on each data sheet the specific item(s) being submitted and the proposed application. Submit Manufacturer's installation instruction. Provide written instructions for raceway products requiring glues, special tools or specific installation techniques.

54.2 MATERIALS

54.2.1 MANUFACTURERS

Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

54.2.1.1 Metal conduit:

54.2.1.1.1 Atkore.

54.2.1.1.2 Nucor

54.2.1.1.3 Wheatland Tube.

54.2.1.2 Nonmetallic conduit:

54.2.1.2.1 Atkore/Atkore/Herritage.

54.2.1.2.2 Cantex.

54.2.1.2.3 Carlon.

54.2.1.2.4 JM Eagle.

54.2.1.3 Flexible metal conduit:

54.2.1.3.1 AFC Cable

54.2.1.3.2 Southwire Co.

54.2.1.3.3 Electri-Flex

54.2.1.4 PVC Coated Metal Conduit:

54.2.1.4.1 Ocal-Blue

54.2.1.4.2 Permacote

54.2.1.4.3 Plastibond

54.2.1.5 Fittings:

54.2.1.5.1 Appleton Electric Co.

54.2.1.5.2 OZ/Gedney.

54.2.1.5.3 Thomas & Betts Corp.

54.2.1.5.4 Steel City Electrical Manufacturing Co.

54.2.1.5.5 Occidental Coating Co. (OCAL).

54.2.1.5.6 Carlon.

54.2.1.5.7 Cooper Crouse-Hinds

54.2.1.5.8 Cantex

54.2.1.5.9 JM Eagle

54.2.2 GALVANIZED RIGID STEEL CONDUIT (GRS)

54.2.2.1 Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and UL 6.

54.2.2.2 Standard threaded couplings, locknuts, bushings and elbows: Only materials of steel or malleable iron are acceptable. Locknuts shall be bonding type with sharp edges for digging into the metal wall of an enclosure.

54.2.2.3 Three piece couplings: Electroplated, cast malleable iron.

54.2.2.4 Insulating bushings: Threaded polypropylene or thermosetting phenolic rated 150 degree C minimum.

54.2.2.5 Insulated grounding bushings: Threaded cast malleable iron body with insulated throat and steel "lay-in" ground lug with compression screw.

- 54.2.2.6 Insulated metallic bushings: Threaded cast malleable iron body with plastic insulated throat rated 150 degrees C.
- 54.2.2.7 All fittings and connectors shall be threaded. Threadless connectors may be used on a case by case basis as approved by AIRPORT AUTHORITY.

54.2.3 PVC INSULATED GALVANIZED RIGID STEEL CONDUIT (PVC GRS)

- 54.2.3.1 Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with nominal 40 mil thermoplastic vinyl coating, heat fused and bonded to the exterior of the conduit.
- 54.2.3.2 Fittings: Conduit couplings and connectors shall be as specified for galvanized rigid steel conduit and shall be factory PVC coated with an insulating jacket equivalent to that of the coated material.

54.2.4 INTERMEDIATE METAL CONDUIT (IMC)

- 54.2.4.1 Conduit: Hot dip galvanized steel meeting the requirements of NEC Article 345 and conforming to ANSI C80.6 and UL 1242.
- 54.2.4.2 Fittings: Conduit couplings, connector and bushing shall be as specified for galvanized rigid steel conduit. Integral retractable type IMC couplings are also acceptable.

54.2.5 ELECTRICAL METALLIC TUBING (EMT)

- 54.2.5.1 Conduit: Shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot dip galvanized after fabrication. Conduit shall conform to ANSI C80.3 Specifications and shall meet UL requirements.
- 54.2.5.2 Raintight couplings: Electroplate steel or cast malleable iron; UL listed raintight and concrete tight, using gland and ring compression type construction.
- 54.2.5.3 Raintight connectors: Electroplated steel or cast malleable iron, UL listed raintight and concrete tight, with insulated throat, using gland and ring compression type construction or standard compression or set screw type.

54.2.6 RIGID NON-METALLIC CONDUIT (PVC)

- 54.2.6.1 Conduit:
 - 54.2.6.1.1 Rigid polyvinyl chloride, Schedule 40 or 80 conforming to NEMA TC1 and UL 651, latest edition. UL listed for exposed and direct-burial applications and for 90 degrees C conductor insulation. Conduit shall include an integral bell fitting at one end.
- 54.2.6.2 Fittings: Couplings, adaptors, transition fittings, etc., shall be molded PVC, slip on, solvent weld type conforming to NEMA TC3 for Schedule 40 or 80.

54.2.7 MISCELLANEOUS CONDUIT FITTINGS AND PRODUCTS

54.2.7.1 Watertight conduit entrance seals: Steel or cast malleable iron bodies and pressure with PVC sleeve, neoprene sealing grommets and PVC coated steel pressure rings. Fittings shall be supplied with neoprene sealing rings between the body and PVC sleeve.

54.2.7.2 Watertight cable sealing bushings: One piece, compression molded sealing ring with PVC coated steel pressure disks, stainless steel sealing screws and zinc plated cast malleable iron locking collar.

54.2.7.3 Fire rated penetration seals:

54.2.7.3.1 UL building materials directory classified.

54.2.7.3.2 Conduit penetrations in fire rated separation shall be sealed with a UL classified fill, void or cavity material.

54.2.7.3.3 The fire rated sealant material shall be the product best suited for each type of penetration and may be a caulk, putty, composite sheet or wrap/strip.

54.2.7.4 Standard products not herein specified:

54.2.7.4.1 Provide listing of standard electrical conduit hardware and fittings not herein specified for approval prior to use or installation, i.e. locknuts, bushings, etc

54.2.7.4.2 Listing shall include Manufacturers name, part numbers and a written description of the item indicating type of material and construction.

54.2.7.4.3 Miscellaneous components shall be equal in quality, material and construction to similar items herein specified.

54.2.7.5 Hazardous area fittings: UL listed for the application.

54.2.8 CATEGORY 6 AND 6A TWISTED PAIR CABLE

54.2.8.1 Four-pair, balanced-twisted pair cable, with internal spline, certified to meet transmission characteristics of Category 6 cable at frequencies up to 350MHz.

54.2.8.2 The minimum requirements for Category 6/6A cables shall conform to TIA/EIA 568B Commercial Building Telecommunications Cabling Standard, Horizontal Cable Section. Application standards supported should include, but not limited to:

54.2.8.2.1 10Base-T through 1GBase-T Ethernet.

54.2.8.2.2 Power over Ethernet (Poe & PoE+).

54.2.8.2.3 155Mb/s ATM and token ring.

54.2.8.2.4 550MHz Broadband Video.

54.2.8.2.5 Backwards compatible to legacy protocols and applications.

- 54.2.8.3 Outdoor Rated Category 6/6A Cable: outdoor rated Category 6/6A cable shall meet all performance requirements as specified for indoor/interior Category 6/6A cable. In addition, the inner construction of the cable shall be surrounded by a filling compound to prevent water ingress. The outer core shall be a sunlight and abrasion resistant black polyethylene outer jacket. Provide outdoor rated cable at all locations identified on the drawings.
- 54.2.8.4 All voice and data ISP and OSP copper backbone cable is to be rated per the environmental conditions in which installed and verified by the contractor before installation. Per code, a plenum cable is to be installed at all times when a communications cable is exposed in a plenum air space. It is the responsibility of the contractor to bid, purchase, install, and verify the rating of the ISP and OSP cable for specific environmental conditions.
- 54.2.8.5 Backbone cables that are exposed to moisture shall be either indoor/outdoor or outdoor rated and contain moisture-blocking materials to prevent moisture damage to cable performance. Select the appropriate cable construction, including external jacket properties, when installing cables in aerial, outdoor, underground, and corrosive environments. This includes conduit installed in slab-on-grade.
- 54.2.8.6 The backbone multi-pair UTP cable shall be Category-3 copper UTP, 24 AWG cable. The total pair count of each Category-3 cable shall be provided as noted in the project drawings. Multiple 25-Pair cables may be required.
- 54.2.8.7 The performance criteria for the UTP backbone cable shall be by the specific standards for the cable's rating. All backbone cables shall perform up to, or beyond the current specification parameters for the published Category-3 rating by the current edition of ANSI/TIA-568.

54.2.9 FIBER OPTIC CABLING

- 54.2.9.1 All single-mode optical fiber cables shall be capable of Ethernet signal transmission at 10 Gb/s up to 10,000 meters in the 1310 nanometer operating window. Maximum attenuation for a single-mode indoor/outdoor cable shall be no greater than 0.5 dB per kilometer using 1310 nanometer and 1550 nanometer wavelengths.
- 54.2.9.2 Each optical fiber strand shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification and all ANSI/TIA-568 performance parameters.
- 54.2.9.3 All optical fibers inside each cable shall be provided in counts indicated in the drawings and usable to the fullest capacity specified by the manufacturer and meet required specifications at all times.
- 54.2.9.4 Outside Plant (OSP) backbone single-mode optical fiber cables shall be:
 - 54.2.9.4.1 Flame-retardant UV-resistant indoor/outdoor rated cables.
 - 54.2.9.4.2 The individual fibers are grouped in jacketed subunits color coded per TIA-598.
 - 54.2.9.4.3 Have dielectric integrated central strength members with surrounding water-swellaable water-blocking strength members.

- 54.2.9.5 The optical fiber cables shall be rated per installation environment as required by the local Authority Having Jurisdiction and/or National Fire Codes. Select an appropriate cable construction, including external jacket properties, when installing optical fiber cables in aerial, outdoor, underground, and corrosive environments.

54.3 CONSTRUCTION METHODS

54.3.1 EXAMINATION

Contractor shall thoroughly examine Project site conditions for acceptance of conduit system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

54.3.2 APPLICATION

- 54.3.2.1 Galvanized rigid steel conduit (GRS) shall be used in the following applications:

54.3.2.1.1 For feeders and branch circuits in wet locations, where susceptible to damage, and in hazardous locations in accordance with NEC and local Codes.

54.3.2.1.2 Up to 8' AFF where in traffic areas and susceptible to damage areas.

- 54.3.2.2 Intermediate metal conduit (IMC): Shall be used for the same application as galvanized rigid steel conduit as specified herein, except for hazardous locations prohibited by CEC, NEC or Local Codes.

- 54.3.2.3 Electrical metallic tubing (EMT): Shall be used exposed or concealed for interior/exterior electrical feeders 4" and smaller, interior/exterior power and lighting branch circuits and low tension distribution system in all ceilings above 6 ft., in concrete slabs and walls not in contact with earth; in stud walls, furred spaces and crawl spaces. EMT shall not be installed exposed below 6 feet above the finish floor except within electrical, communication or signal rooms or closets, chases, shafts, mechanical rooms and other areas acceptable to the NEC and approved by engineer/owner.

- 54.3.2.4 Rigid non-metallic conduit (PVC): Shall be used in the following applications:

54.3.2.4.1 Schedule 40 for feeders and branch circuits run beneath ground floor slab except that bends and penetrations through the floor must be PVC coated galvanized rigid steel or 10MIL wrapped rigid. Schedule 80 PCV conduit stub-ups are acceptable for use for through slab penetrations to 6" AFF or penetrations through exterior walls. Exposed PVC conduits are not allowed in public spaces.

54.3.2.4.2 Schedule 40 for exterior branch circuits.

54.3.2.4.3 PVC may be used below exterior slab and areas outside building footprint subject to vehicular traffic.

54.3.2.4.4 Only schedule 80 PVC may be used for above ground conduit extensions on utility poles.

54.3.2.4.5 In general, PVC may not be run exposed or in floor slabs unless expressly indicated on the Drawings.

54.3.3 PREPARATION

- 54.3.3.1 Locations of conduit runs shall be planned in advance of the installation and coordinated with other work in the same areas.
- 54.3.3.2 Where practical, install conduits in groups in parallel vertical or horizontal runs and at elevations that avoid unnecessary offsets.
- 54.3.3.3 All conduits shall be run parallel or at right angles to the centerlines of columns and beams, whether routed exposed, concealed above suspended ceiling or in concrete slabs.
- 54.3.3.4 In long runs of conduit, provide sufficient pull boxes to facilitate pulling wires and cables within the pull tension rating of the wires and cables, with spacing not to exceed 250 feet. These pull boxes are not indicated on the Drawings.
- 54.3.3.5 Provide all reasonably inferred standard conduits fitting and products required to complete conduit installation to meet the intended application whether noted, indicated or specified in the Contract Documents or not.

54.3.4 INSTALLATION

- 54.3.4.1 Install conduit in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- 54.3.4.2 Minimum Conduit Size: Unless otherwise noted herein or on Drawings or if approved by the equipment manufacturer and AIRPORT AUTHORITY, minimum conduit size shall be 3/4".
- 54.3.4.3 All conduit sizes indicated on the Drawings are sized for copper conductors with THHN/THWN insulation. If conductor type or size is changed the Contractor shall be responsible for resizing conduits upward to meet Code.
- 54.3.4.4 In general, all conduit work shall be concealed in areas where the public has access unless approved by .
- 54.3.4.5 Install conduits in complete runs before pulling in cables or wires.
- 54.3.4.6 Install conduit free from dented, bruises or deformations. Remove and replace any damaged conduits with new undamaged material.
- 54.3.4.7 When exposed to outdoor conditions conduits shall be well protected and tightly covered.
- 54.3.4.8 In making joints in rigid steel conduit, ream conduit smooth after cutting and threading. Coat all field-threaded joints with UL approved conductive type compound to ensure low resistance ground continuity through conduit and to prevent seizing and corrosion.
- 54.3.4.9 Clean any conduit in which moisture or any foreign matter has collected before pulling in conductors. Paint all field-threaded joints to prevent corrosion.
- 54.3.4.10 In all empty conduits or ducts, install a pull string or cord.

- 54.3.4.11 Conduit systems shall be mechanically and electrically continuous throughout. Install code size, insulated, copper grounding conductors in all conduit runs for branch circuits and feeders. This conductor is not indicated on the Drawings. Refer to Section 260526: Grounding and Bonding.
- 54.3.4.12 Metallic conduit shall not be in contact with other dissimilar metal pipes (i.e. plumbing).
- 54.3.4.13 Make bends with standard conduit bending hand tool or machines. The use of any item not specifically designed for the bending of electrical conduit is strictly prohibited.
- 54.3.4.14 A run of conduit between terminations at wire pulling points shall not contain more than the equivalent of four quarter bends (360 degrees, total).
- 54.3.4.15 Emergency power raceway system: Install entirely independent of other raceway systems, except where specifically allowed by NEC Article 517.
- 54.3.4.16 Conduit for conductors above 600 volts use rigid steel, unless installed underground or under slab.

54.3.5 PENETRATIONS

- 54.3.5.1 Locate penetrations and holes in advance where they are proposed in the structural sections such as footings, beams, wall, etc. Penetrations are acceptable only when the following occurs:
 - 54.3.5.1.1 Where indicated on coordinated drawings.
 - 54.3.5.1.2 As approved by the Structural Engineer prior to construction and after submittal of Drawing showing location, size and position of each penetration.
- 54.3.5.2 Cutting or holes:
 - 54.3.5.2.1 Cut holes through concrete, masonry block or brick floors and floors of structure with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Structural Engineer as required by limited working space. Obtain the approval of the Structural Engineer prior to drilling through structural sections.
 - 54.3.5.2.2 Provide sleeves or "can outs" for cast-in-place concrete floors and walls. Following conduit installation, seal all penetrations using non-iron bearing, chloride free, non-shrinking, dry-pack grouting compounds; or fire rated penetration-sealing materials.
 - 54.3.5.2.3 Cut holes for conduit penetrations through non-concrete and non-masonry walls, partitions or floors with a hole saw. The hole shall be only as large as required to accommodate the size of the conduit.
- 54.3.5.3 Sealing:
 - 54.3.5.3.1 Non-rated penetrations: Pack opening around conduits with non-flammable insulating material and seal with gypsum wallboard taping compound.

54.3.5.3.2 Fire stop: Where conduits, wireways and other electrical raceways pass through fire rated partitions, walls, smoke partitions or floor; install a UL classified fire stop material to provide an effective barrier against the spread of fire, smoke and gases. Completely fill and seal clearances between raceways and openings with the fire stop material.

54.3.5.4 Waterproofing: At floor, exterior wall, and roof conduit penetrations:

54.3.5.4.1 Install specified watertight conduit entrance seals at all below grade wall penetrations. Conduits penetrating exterior building walls and building floor slab shall be PVC coated rigid galvanized steel or 10mil wrapped. Schedule 80 PCV conduit stub-ups are acceptable for use for through slab penetrations to 6" AFF or penetrations through exterior walls. Exposed PVC conduits are not allowed in public spaces.

54.3.5.4.2 Coordinate with roofer for roof penetrations and roof flashing.

54.3.5.4.3 Conduits that horizontally penetrate a waterproof membrane shall fall away from and below the penetration on the exterior side a minimum of two times the conduit diameters.

54.3.6 TERMINATIONS AND JOINTS

54.3.6.1 Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated.

54.3.6.2 Raceways shall be joined using specified couplings or transition couplings where dissimilar raceway systems are joined.

54.3.6.3 Conduits shall be securely fastened to cabinets, boxes and gutters using two locknuts and an insulating bushing or specified insulated connectors. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors. Install grounding bushings or bonding jumpers on all conduits terminating at concentric or eccentric knockouts.

54.3.6.4 Conduit terminations exposed at weatherproof enclosures and cast outlet boxes shall be made watertight using specified connectors and hubs.

54.3.6.5 Stub-up connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this contract, install screwdriver operated threaded flush plugs with floor.

54.3.6.6 Install specified cable sealing bushings or raceway seal on all conduits originating outside the building walls and terminating in switchgear, cabinets or gutters inside the building. Install cable sealing bushings or raceway seal for conduit terminations in all grade level or below grade exterior pull, junction or outlet boxes.

54.3.6.7 Raceway seal: Inject into wire filled raceways, a pre-formulated rigid 2 lbs. density polyurethane foam which expands a minimum 35 times it's original bulk. Foam shall have the physical properties of water vapor transmission of 1.2 to 3.0 perms; water absorption less than 2% by volume, fungus and bacterial resistant. Foam shall permanent seal against water, moisture, insects and rodents. Install raceway sealing foam at the following points:

54.3.6.7.1 Where conduits enter the building from below grade.

54.3.6.8 Install expansion assembly (Flexible metallic conduit) where any conduit crosses a building separation or expansion joint as follows:

54.3.6.8.1 Conduits shall be rigidly secured to the building structure on opposite sides of a building expansion joint and provided with flexible conduit with slack as per seismic expansion criteria. Install the Flexible conduit in accordance with industry standards.

54.3.6.9 Use short length (maximum of 6ft) of the appropriate FMC or LFMC conduit for connections to motors, light fixtures, and other electrical equipment subject to movement, vibration, misalignment, cramped quarters or noise transmission. Provide liquid tight flexible metal conduit for installation in exterior locations, moisture or humidity-laden atmosphere, corrosive atmosphere, water hose or spray wash-down operations and locations subject to seepage or dripping of oil, grease or water. Provide a green ground wire with FMC or LFMC conduit.

54.3.7 HAZARDOUS LOCATIONS

54.3.7.1 Use rigid steel conduit only.

54.3.7.2 Install UL approved sealing fittings that prevent passage of explosive vapors in accordance with the Manufacturers written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank coverplate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:

54.3.7.2.1 Where conduits enter or leave hazardous locations.

54.3.7.2.2 At lighting fixtures, switches, receptacles and as required by the NEC.

54.3.8 SUPPORTS

54.3.8.1 Provide supports for raceways as specified in Section 260529: Electrical Hangers and Supports.

54.3.8.2 All raceways systems shall be secured to building structures using specified fasteners, clamps and hangers spaced according to the NEC.

54.3.8.3 Support single runs of conduit using one-hole pipe straps, cable/conduit clip or wing straps. Where run horizontally on walls in damp or wet locations, install "clamp backs" to space conduit off the surface.

- 54.3.8.4 Multiple conduit runs shall be supported using "trapeze" hangers fabricated from specified construction channel, mounted to 1/4"-inch diameter, threaded steel rods secured to building structures. Fasten conduit to construction channel with standard one-hole pipe clamps or the equivalent. Provide lateral seismic bracing for hangers. When groups are run in a vertical orientation use 1/4" threaded rod securing conduit to rod.
- 54.3.8.5 Individual 3/4" and 1" conduits installed above suspended ceilings may be attached to the ceiling's hanger wire and grid using spring steel support clips provided that not more than two conduits are attached to any single support wire.
- 54.3.8.6 Support exposed vertical conduit runs at each floor level, independent of cabinets or switches to which they run, by means of acceptable supports.
- 54.3.8.7 Fasteners and supports in solid masonry and concrete:
 - 54.3.8.7.1 Use steel or malleable iron concrete inserts set in place prior to placing the concrete or screw in concrete anchors.
 - 54.3.8.7.2 After concrete installation:
 - 54.3.8.7.2.1 *Steel expansion anchors not less than 1/4 inch bolt size and not less than 1-1/8 inch embedment.*
 - 54.3.8.7.2.2 *Power set fasteners not less than 1/4 inch diameter with depth of penetration not less than 3/4" inches.*
 - 54.3.8.7.2.3 *Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.*
 - 54.3.8.7.3 Hollow masonry: Toggle bolts are permitted. Bolts supported only by masonry block are not acceptable.
 - 54.3.8.7.4 Metal structures: Use machine screw fasteners or other devices specifically designed and approved for the application.

54.4 BASIS OF PAYMENT

54.4.1

Payment shall be made at contract unit price necessary to complete the work. This price shall be full compensation for overhead and profit, furnishing all materials, all preparation, and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment will be made under:

Bid Item 89: CAT 6 and 6A Twisted Cable, per linear foot

Bid Item 90: Fiber Optic Cable, per linear foot

Bid Item 91: Underground Electrical Duct Banks and Conduits - One 1-inch Conduit
(Direct Buried) [1 to 500 feet], per linear foot

Bid Item 92: Underground Electrical Duct Banks and Conduits - One 1-inch Conduit
(Direct Buried) [500 feet or more], per linear foot

Bid Item 93: Underground Electrical Duct Banks and Conduits - One 2-inch Conduit
(Direct Buried) [1 to 500 feet], per linear foot

Bid Item 94: Underground Electrical Duct Banks and Conduits - One 2-inch Conduit
(Direct Buried) [500 feet or more], per linear foot

Bid Item 99: Underground Electrical Duct Banks and Conduits - Two 2-inch Conduit
(Direct Buried) [1 to 500 feet], per linear foot

Bid Item 100: Underground Electrical Duct Banks and Conduits - Two 2-inch Conduit
(Direct Buried) [500 feet or more], per linear foot

END OF SPECIFICATION

55 UNDERGROUND DUCTS AND STRUCTURES

55.1 DESCRIPTION

55.1.1 General Requirements:

The work includes Underground conduits and ducts, Duct banks, Handhole and pullboxes, manholes, excavation, trenching, and backfill.

55.1.2 Submittals:

Submittals shall consist of:

- 55.1.2.1 Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
- 55.1.2.2 Clearly mark on each data sheet the specific item(s) being submitted and the proposed application
- 55.1.2.3 Submit duct bank detail sections, pulling tension and side wall pressure calculations, and Neher-McGrath calculations for all power feeder conduit runs.
- 55.1.2.4 Shop Drawings showing details and design calculations for precast manholes and handholes including reinforced steel. Stamp Drawings with seal of registered professional Structural Engineer.
- 55.1.2.5 Submit Manufacturer's installation instructions.
- 55.1.2.6 Complete bill of material listing all components.
- 55.1.2.7 Certificate for concrete and steel used in underground precast concrete utility structures, according to ASTM C858.
- 55.1.2.8 Inspection report for factory inspections, according to ASTM C1037.
- 55.1.2.9 Coordination Drawings showing duct profiles and coordination with other utilities and underground structures. Include plans and section drawn to accurate scale

55.2 MATERIALS

55.2.1 MANUFACTURERS

Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

55.2.1.1 Underground precast concrete utility structures:

55.2.1.1.1 Oldcastle Enclosure Solutions.

55.2.1.1.2 Jensen Precast.

55.2.1.2 Conduits, ducts and fittings:

55.2.1.2.1 Refer to Section 54 Conduit.

55.2.2 CONDUIT AND DUCT

55.2.2.1 Refer to Section 54 Conduit

55.2.2.2 Duct supports: Rigid PVC spacers selected to provide minimum duct spacing and concrete cover depths, while supporting ducts during concrete pour.

55.2.2.3 Duct sealing compound: Non-hardening, safe for human skin contact, not deleterious to cable insulation, workable at temperatures as low as 35 degree F, withstands temperature of 300 degrees F without slump and adheres to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, cable sheaths and jackets, etc

55.2.3 PULLBOXES AND HANDHOLES

55.2.3.1 Construction: High densities precast reinforced concrete box, extension, base and cover. Furnish box with end and side knockouts and non-settling shoulders. Cover shall have hold-down bolts and two lifting eyes.

55.2.3.2 Size: As indicated on the Drawings.

55.2.3.3 Cover markings:

55.2.3.3.1 "ELEC-LV" for electrical power circuits 600V or less.

55.2.3.3.2 "ELEC-HV" for electrical power circuits over 600V.

55.2.3.3.3 "COMM" for communications circuits. A custom 5-digit number shall be added to the cover. Contact the Airport Authority Engineer for number assignment. The minimum letter height shall be one inch.

55.2.3.4 Rated covers: Use cast iron lid with H20 traffic rating when subject to vehicular traffic.

55.2.4 MANHOLES

55.2.4.1 Precast concrete: Concrete mix and reinforcing placement shall be in accordance with ACI 318. Design tops and wall structures for AASHTO H20 highway loading, with 30 percent loading added for impact. Walls shall withstand all soil pressures, taking into consideration the soil encountered and ground water level present at the Project site. Assume ground water level three feet below ground surface unless a higher water table is indicated in soils report.

55.2.4.2 Construction:

55.2.4.2.1 Monolithic or modular assembled sections.

55.2.4.2.2 Assembled sections shall have mating edges with tongue and groove joints. Joints shall firmly interlock adjoining components and provide waterproof junctions. Seal joints watertight using preformed plastic strip conforming to FS SS-S-210.

55.2.4.2.3 Provide lifting devices cast into units for proper handling of units.

55.2.4.2.4 Identify all structures with Manufacturer's name embedded in or otherwise permanently attached to an interior wall face.

55.2.4.2.5 Include concrete knockout panels for conduit entrance and sleeve for ground rod.

55.2.4.2.6 Protective coating: Plant-applied, coal-tar, epoxy-polyamide paint 15-mil minimum thickness applied to the exterior and interior surfaces.

55.2.4.3 Size and dimensions: As indicated on Drawings.

55.2.4.4 Accessories:

55.2.4.4.1 Frames and covers: Cast iron with cast-in legend "ELEC-LV", "ELEC-HV" or "COMM" as appropriate. Machine cover-to-frame bearing surfaces.

55.2.4.4.2 Sump frame and grate: Comply with FS RR-F-621, Type VII for frame and Type I for cover.

55.2.4.4.3 Pulling eyes in walls: Eyebolt with reinforcing bar fastening insert. 2-inch diameter eye, 1-inch by 4-inch bolt. Working load embedded in 6-inch, 4000-PSI concrete: 13,000 pounds minimum tension.

55.2.4.4.4 Pulling and lifting irons in floor: 7/8-inch diameter, hot-dipped galvanized, bent steel rod, stress relieved after forming and fastened to reinforced rod. Exposed triangular opening. Ultimate yield strength: 40,000 pounds shear and 60,000 pounds tension.

55.2.4.4.5 Bolting inserts for cable stanchions: Flared, threaded inserts of non-corrosive, chemical resistant, nonconductive thermoplastic material; 1/2-inch internal diameter by 2-3/4 inch deep, flared to 1-1/4 inch minimum at base. Tested ultimate pull-out strength: 12,000 pounds minimum.

55.2.4.4.6 Expansion anchors for installation after concrete is cast: Zinc-plated carbon steel wedge type with stainless-steel expander cup 1/2-inch bolt size, 5,300 pound rated pull-out strength and 6800 pound rated shear strength minimum.

- 55.2.4.4.7 Cable stanchions: Hot-rolled, hot-dipped, galvanized "T" section steel, 2 - 1/4 inches size, punched with 14 holes on 1-1/2 inch centers for cable arm attachment.
- 55.2.4.4.8 Cable arms: 3/16-inch thick hot-rolled, hot-dipped galvanized sheet steel pressed to channel shape, approximately two 12-inches wide by 14-inches long and arranged for secure mounting in horizontal position at any position on cable stanchions.
- 55.2.4.4.9 Cable support insulators: High glaze, wet-process porcelain arranged for mounting on cable arms.
- 55.2.4.4.10 Ground rods: Solid copper, 3/4-inch diameter by 10-feet length.
- 55.2.4.4.11 Ground wire: Stranded bare copper conductor, #6 AWG.
- 55.2.4.4.12 Steps: Cast iron, suitable for shape and construction.

55.2.5 CONSTRUCTION MATERIALS

- 55.2.5.1 Mortar: Conform to ASTM C270, Type M, except for quantities less than 2.0 Cu. Ft., where packaged mix complying with ASTM C387, Type M may be used.
- 55.2.5.2 Concrete: Conform to Section 11: Portland Cement Concrete.
 - 55.2.5.2.1 Strength: 3,000-PSI minimum 28-day compressive strength.
 - 55.2.5.2.2 Aggregate for duct encasement: 3/8-inch maximum size.
 - 55.2.5.2.3 Colorant (if not under the building footprint): The concrete shall be dyed red with an integral red-oxide coloring pigment in the proportion of 8 pounds per cubic yard of concrete. Surface treatment coloring application will not be accepted.
 - 55.2.5.2.4 Dry thermal resistivity (Rho): 54 or less with 5% water content

55.3 CONSTRUCTION METHODS

55.3.1 EXAMINATION

Contractor shall thoroughly examine Project site conditions for acceptance of duct and manhole installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

55.3.2 EARTHWORK

55.3.2.1 Excavation for underground electrical structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation or services, other construction and for inspection.

55.3.2.1.1 Excavate, by hand, areas within drip-line of large trees. Protect the root system for damage and dry-out. Maintain moist conditions for root system and over exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.

55.3.2.1.2 Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.

55.3.2.2 Trenching: Excavate trenches for electrical installation as follows:

55.3.2.2.1 Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearances on both sides of raceways and equipment.

55.3.2.2.2 Excavate trenches to depth indicated or required.

55.3.2.2.3 Limit the length of open trench to that in which installations can be made and the trench backfilled within a reasonable/coordinated amount of time.

55.3.2.2.4 Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.

55.3.2.3 Trenching for concrete encased ducts:

55.3.2.3.1 Pitch the trench uniformly towards manholes or both ways from high points between manholes for the required duct line drainage. Avoid pitching the ducts toward building wherever possible.

55.3.2.3.2 The walls of the trench may be used to form the sidewalls of the duct bank provided that the soil is self-supporting and that concrete envelope can be poured without soil inclusions. Forms are required where the soil is not self-supporting.

55.3.2.3.3 After the concrete encased duct has sufficiently cured for 24 hours, the trench shall be backfilled to grade with earth

55.3.2.4 Backfilling and filling: Place soil materials in layers to required sub-grade elevations for each area classification.

55.3.3 CONDUIT AND DUCT INSTALLATION

55.3.3.1 Install duct lines in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

55.3.3.2 Application:

55.3.3.2.1 Below building slab-on-grade: Schedule 40, minimum 4-inches below bottom of slab and under vapor barrier except that bends and penetrates through floor slab shall be PVC coated galvanized rigid steel or 10MIL wrapped rigid.

55.3.3.2.2 Penetrations of building and equipment slabs: PVC insulated rigid steel or 10MIL wrapped rigid.

55.3.3.2.3 Underground within 5-feet from foundation walls: Provide rigid steel conduit, plastic coated conduit or thickwall non-metallic conduit. Provide cast metal or non-metallic boxes.

55.3.3.2.4 Schedule 80 PCV conduit stub-ups are acceptable for use for through slab penetrations to 6" AFF or penetrations through exterior walls. Exposed PVC conduits are not allowed in public spaces.

55.3.3.3 Slope duct to drain towards manholes and handholes and away from building and equipment entrances.

55.3.3.4 Underground conduit stub-ups to inside of building and exterior equipment shall be PVC insulated rigid steel or 10MIL wrapped rigid.

55.3.3.5 Make joints in ducts and fittings watertight according to Manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in the same plane.

55.3.3.6 Terminate duct lines at manholes and handholes built-in, cast-in-place terminators.

55.3.3.7 Separation between duct lines shall be 3-inches minimum for like systems and 6 inches minimum between power and signal ducts.

55.3.3.8 Concrete encased ducts:

55.3.3.8.1 Duct lines shall consist of single or multiple duct assemblies encased in concrete. Ducts material throughout the installation.

55.3.3.8.2 Rigid PVC spacers shall securely support and maintain uniform spacing of the duct assembly a minimum of 3-inches above bottom of trench during the concrete pour. Spacer spacing shall not exceed 5-feet.

55.3.3.8.3 Provide non-ferrous tie wires to prevent displacement of the ducts during pouring of concrete.

55.3.3.8.4 Separate ducts 3-inches for like systems and 6-inches between power and signal ducts.

55.3.3.8.5 Provide spare conduits per electrical drawings.

55.3.3.9 Provide underground warning tape per Specification Section: 260543 Electrical Identification.

55.3.3.10 Mandrel all ducts upon completion of installation and prior to pulling cables.

55.3.4 HANDHOLE AND PULL BOX INSTALLATION

- 55.3.4.1 Install handholes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- 55.3.4.2 Handholes shall be installed flush with finished grade or surface. Install on a level 6-inch bed of well-tamped gravel or crushed stone.
- 55.3.4.3 Orientation of handholes shall be coordinated in advance with Landscape Architect and arranged to minimize connecting duct bends and deflections.

55.3.5 MANHOLE INSTALLATION

- 55.3.5.1 Install precast assembly in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.
- 55.3.5.2 Install manhole with rooftop at least 15-inches below finished grade. Access shall be via 30-inch diameter precast chimney from roof opening to finished grade.
- 55.3.5.3 Install cast iron frame and cover. Set frames in paved areas and traffic ways flush with finished grade. Set other frames 1-inch above finished grade.
- 55.3.5.4 Units shall be installed on a level 12-inch bed of well-tamped gravel or crushed stone.
- 55.3.5.5 Install drains in bottom of units where indicated.
- 55.3.5.6 Install removable hardware, including pulling eyes, cable stanchions, cable arms and insulators, as required for installation and support of cable and conductors and as indicated.
- 55.3.5.7 Provide cable rack support as indicated and required. Support intervals shall not exceed 36-inches. Each rack shall include cable support insulators.
- 55.3.5.8 Drive ground rod into earth, through the floor sleeve, after manhole is set in place. Fill the sleeve with a sealant to make a watertight seal.
- 55.3.5.9 Install ground wire around the inside perimeter of manhole and anchor to wall. Connect the wire to the ground rod by exothermic welding process to form solid metal joint. Bond the ground wire to the exposed non-current carrying metal parts of racks and like items in the manhole.
- 55.3.5.10 Do not drill deeper than 3-7/8 inches for anchor bolts installed in the field. Use a minimum of 2 anchors for each cable stanchion.

55.4 BASIS OF PAYMENT

55.4.1

Payment shall be made at contract unit price necessary to complete the work. This price shall be full compensation for overhead and profit, furnishing all materials, all preparation, and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment will be made under:

Bid Item 95: Underground Electrical Duct Banks and Conduits - One 1-inch Conduit (Concrete Encased) [1 to 500 feet], per linear foot

Bid Item 96: Underground Electrical Duct Banks and Conduits - One 1-inch Conduit (Concrete Encased) [500 feet or more], per linear foot

Bid Item 97: Underground Electrical Duct Banks and Conduits - One 2-inch Conduit (Concrete Encased) [1 to 500 feet], per linear foot

Bid Item 98: Underground Electrical Duct Banks and Conduits - One 2-inch Conduit (Concrete Encased) [500 feet or more], per linear foot

Bid Item 101: Electrical LV, Electrical HV, and Communication - Handhole/Pullbox, per each unit

Bid Item 102: Electrical Manholes and Junction Structures - H20 Rated, per each unit

Bid Item 103: Electrical Manholes and Junction Structures - Adjust Handhole to Grade, per each unit

END OF SPECIFICATION

EXHIBIT E

GENERAL PROVISIONS

(attached)

GENERAL PROVISIONS

SECTION 0. GENERAL PROVISIONS DEFINED

0-1 STANDARD SPECIFICATIONS

The 2024 edition of “Standard Specifications for Public Works Construction” (“Standard Specifications”), and 2025 State of California Department of Transportation Standard Specification as amended by the Contract Documents, are incorporated into the Contract Documents by this reference. The work described herein shall be done in accordance with the provisions of the Standard Specifications, as amended by the Contract Documents.

0-2 NUMBERING OF SECTIONS

The number of sections and subsections in these General Provisions are compatible with the numbering in the Standard Specifications.

0-3 SUPPLEMENTATION OF STANDARD SPECIFICATIONS

The Sections that follow supplement, but do not replace, the corresponding provisions in Part 1 (General Provisions) of the Standard Specifications, except as otherwise indicated herein. In the event of any conflict between the Standard Specifications and these General Provisions, these General Provisions shall control.

SECTION 1. TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

1-2 TERMS AND DEFINITIONS

Whenever in the Standard Specifications or in the Contract Documents the following terms are used, they shall be understood to mean the following:

Airport Project Manager (APM) – Person designated by the Sr. Manager, Engineering and Project Delivery to have design and/or construction management oversight responsibilities for the project.

Agency – The Burbank-Glendale-Pasadena Airport Authority.

Board – The Commission of the Burbank-Glendale-Pasadena Airport Authority.

Contract Documents – As defined in Standard Specifications Section 1-2, but also including the General Provisions and Special Provisions.

County – County of Los Angeles, California.

Sr. Manager, Engineering and Project Delivery – Vincent Nguyen, unless and until written notice of a change in the Sr. Manager, Engineering and Project Delivery is given by the Authority to Contractor.

Engineer – Shall refer to APM.

Inspector – An authorized representative of the Authority, assigned by the Authority to make inspections of Work performed by or materials supplied by the Contractor.

Laboratory – A laboratory authorized by the Authority to test materials and Work involved in the Contract.

Project – See Scope of Work.

Submittal – Any drawing, calculation, specification, product data, samples, manuals, requests for substitutes, spare parts, photographs, survey data, traffic control plans, record drawings, Bonds or similar items required to be submitted to the Authority under the terms of the Contract.

1-3.3 Institutions

The institutions listed in Section 1-3.3 of Part 1 of the Standard Specifications shall be supplemented by the list below:

<u>Abbreviation</u>	<u>Word or Words</u>
AAN	American Association of Nurserymen
ACI	American Concrete Institute
AGCA	Associated General Contractors of America
APWA	American Public Works Association
ASME.....	American Society of Mechanical Engineers
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
IEEE.....	Institute of Electric and Electronic Engineers
NEC	National Electric Code
NEMA.....	National Electrical Manufacturers Association
NFPA.....	National Fire Protection Association
SSS.....	State of California Standard Specifications, Latest edition, Department of Transportation
SSP.....	State of California Standard Plans, Latest edition, Department of Transportation

1-7.2 CONTRACT BONDS

The Faithful Performance Bond shall remain in force until the date of recordation of the Notice of Completion and the end of all warranty periods set forth in the Contract Documents. The Material and Labor Bond shall remain in force until expiration of the time within which the California Labor Commissioner may serve a civil wage and penalty assessment against the principal, any of its subcontractors, or both the principal and its subcontractors pursuant to Labor Code Section 1741, and until the expiration of the time within which a joint labor management committee may commence an action against the principal, any of its subcontractors, or both the principal and its subcontractors pursuant to Labor Code Section 1771.2.

All Bonds must be submitted using the required forms, which are in the Contract Documents, or on any other form approved by Authority Counsel.

SECTION 2. SCOPE OF THE WORK

2.2 PERMITS

Before starting any construction work, the Contractor will be required to obtain all necessary permits from the appropriate agency. Should this Project require construction of trenches or excavations which are five (5) feet or deeper and into which a person is required to descend, the Contractor shall obtain a Cal/OSHA permit and furnish the Authority with a copy before Work can commence on this Project. Contractor shall bear all cost for fees for all agencies except for the Authority's permit fees.

2.4 COOPERATION AND COLLATERAL WORK

The Contractor shall be responsible for coordinating all Work with the Authority's street sweeping, trash pick-up, and street maintenance contractors, emergency services departments, utility companies' crews, and others when necessary. The Contractor shall be responsible for the disposal of all trash that results from the Project. Payment for conforming to these requirements shall be included in other items of Work, and no additional payment shall be made thereof.

2-5.4 Haul Routes

Subsection 2-5.4 of Part 1 of the Standard Specifications shall be deleted and replaced as follows:

The Contractor must obtain the APM's approval before using any haul routes. Further detailed requirements for haul traffic are delineated in the Special Provisions.

2-7 CHANGES INITIATED BY THE AGENCY

2-7.1 General.

The Authority reserves the right, without notice to the Surety, to increase or decrease the quantity of any item or portion of the Work described in the Contract Documents or to alter or omit portions of the Work so described, as may be deemed necessary or expedient by the APM, without in any way making the Contract void. Such increases, alterations or decreases of Work shall be considered and treated as though originally contracted for, and shall be subject to all the terms, conditions and provisions of the original Contract. The Contractor shall not claim or bring suit for damages, whether for loss of profits or otherwise, on account of any decrease, alteration or omission of any kind of Work to be done.

2-8 EXTRA WORK

New and unforeseen work will be classified as Extra Work only when the Work is not covered and cannot be paid for under any of the various items or combination of items for which a Bid price appears on the Bid. The Contractor shall not do any Extra Work except upon written order from the APM.

SECTION 3. CONTROL OF THE WORK

3-1 ASSIGNMENT

Any purported assignment without written consent of the Authority shall be null, void, and of no effect, and the Contractor shall hold harmless, defend and indemnify the Authority and its officers, officials, employees, agents and representatives with respect to any claim, demand or action arising from or relating to any unauthorized assignment.

If the Authority opts to consent to assignment, the Authority's consent shall be contingent upon: (1) a letter from the Surety agreeing to the assignment and assigning all of the Bonds to the assignee without any reduction, or the assignee supplying all new Bonds in the amounts originally required under the Contract Documents; and (2) the assignee supplying all of the required insurance in the amounts required in the Contract Documents. Until the Surety assigns all of the Bonds or the assignee supplies all of the new Bonds, and until the assignee supplies all of the required insurance, an assignment otherwise consented to in writing by the Authority shall not be effective. Even if the Authority consents to assignment, no assignment shall relieve the Contractor of liability under the Contract.

3-5 INSPECTION

The Contractor shall arrange and pay for all off-site inspection of the Work required by any ordinance or governing authorities. The Contractor shall also arrange and pay for other inspections, including tests in connection therewith, as may be assigned or required.

3.7 CONTRACT DOCUMENTS

3-7.1 General

In addition to the requirements under Section 3-7.1 in the Standard Specifications, the Contractor shall maintain a control set of Plans and Specifications on the Project site at all times. All final locations determined in the field, and any deviations from the Plans and Specifications, shall be marked in red on the control set to show the as-built conditions. This control set of Plans shall also be edited for all Addenda, Requests for Information, Change Orders, field changes not involving cost, and any other variation that occurred during construction. Upon completion of all Work, the Contractor shall return the control set to the APM. Final payment will not be made until this requirement is met.

Where a work feature is shown on the drawings or identified in the Specifications but is not specifically indicated as an item in the Bid sheet/Fee Schedule, and there is no ambiguity regarding the requirement to construct, install, or construct and install that work feature, the Contractor is required to complete the work feature. All costs to the Contractor for constructing, installing, or both constructing and installing such a work feature shall be included in the Bid.

3-7.2 Precedence of the Contract Documents

With regard to Section 3-7.2 in the Standard Specifications, the order of precedence shall be as follows:

1. Permits issued by regulatory agencies with jurisdiction.
2. Change Orders and Supplemental Agreements, whichever occurs last.
3. Construction Agreement.
4. Addenda.
5. Notice Inviting Bids.

6. Instructions to Bidders.
7. Bid.
8. Special Provisions.
9. General Provisions.
10. Plans.
12. Standard Specifications.

3-9 SUBSURFACE DATA

If the Authority or its consultants have made investigations of subsurface conditions in areas where the Work is to be performed, such investigations shall be deemed made only for the purpose of study and design. If a geotechnical or other report has been prepared for the Project, the Contractor may inspect the records pertaining to such investigations subject to and upon the conditions hereinafter set forth. The inspection of the records may be made in the Airport Engineering Office. It is the Contractor's sole responsibility to determine whether such investigations exist, and the Authority makes no affirmative or negative representation concerning the existence of such investigations.

The records of any such investigations are made available solely for the convenience of the Contractor. It is expressly understood and agreed that the Authority, the APM, their agents, consultants or employees assume no responsibility whatsoever with respect to the sufficiency or accuracy of any investigations, the records thereof, and the interpretations set forth therein. No warranty or guarantee is expressed or implied that the conditions indicated by any such investigations or records are representative of those existing in the Project area. The Contractor agrees to make such independent investigations and examination as necessary to be satisfied of the conditions to be encountered in the performance of the Work.

The Contractor represents that it has studied the Plans (if made available), Specifications and other Contract Documents, and all surveys and investigation reports of subsurface and latent physical conditions, has made such additional surveys and investigations as necessary for the performance of the Work at the Contract Price in accordance with the requirements of the Contract Documents, and that it has correlated the results of all such data with the requirements of the Contract Documents.

When additional plans, studies, or investigation documents pertaining to future phases or portions of the Work are provided to the Contractor, the Contractor shall promptly review such documents and incorporate any relevant information into its approach for the Work.

No claim of any kind shall be made or allowed for any error, omission or claimed error or omission, in whole or in part, of any geotechnical exploration or any other report or data furnished or not furnished by the Authority.

3-10 SURVEYING

3-10.1 General

The Contractor shall verify all dimensions on the drawings and shall report to the Authority any discrepancies before proceeding with related Work. The Contractor shall perform all survey and layout Work per the Project Plans. All surveying Work must conform to the Professional Land Surveyors' Act (Business and Professions Code

Section 8700 *et seq*). All Project surveying notes and “cut-sheets” are to be provided to the Authority after the completion of each surveying activity and all final surveying notes shall be provided before final payment to the Contractor.

Construction stakes shall be set and stationed by Contractor at its expense. Unless otherwise indicated in the Special Provisions, surveying costs shall be included in the price of items bid. No separate payment will be made. Re-staking and replacement of construction survey markers damaged as a result of the Work, vandalism, or accident shall be at the Contractor’s expense.

3-11 CONTRACT INFORMATION SIGNS

The names, addresses and specialties of the Contractor, Subcontractors, architects or engineers may not be displayed on any signage within the public right-of-way. This signage prohibition includes advertising banners hung from truck beds or other equipment.

3-12 WORKSITE MAINTENANCE

3-12.1 General.

Clean-up shall be done as Work progresses at the end of each day and thoroughly before weekends. The Contractor shall not allow the Work site to become littered with trash and waste material, but shall maintain the same in a neat and orderly condition throughout the construction operation. Unless otherwise approved by the APM, materials which need to be disposed shall not be stored on Airport property site and shall be removed by the end of each Working Day. If the job site is not cleaned to the satisfaction of the APM, the cleaning will be done or contracted by the Authority and shall be back-charged to the Contractor and deducted from the Contract Price.

The Contractor shall promptly remove from the vicinity of the completed Work, all rubbish, debris, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the Work by the Authority will be withheld until the Contractor has satisfactorily complied with the foregoing requirements for final clean-up of the Project site.

3.12.4 Storage of Equipment and Materials.

3-12.4.1 General

The Contractor shall make arrangements for storing its equipment and materials. The Contractor shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the Work. Approved areas within Work site may be used for temporary storage; however, the Contractor shall be responsible for obtaining any necessary permits from the Authority. In any case, the Contractor’s equipment and personal vehicles of the Contractor’s employees shall not be parked on the traveled way or on any section where traffic is restricted at any time.

The Contractor shall deliver, handle, and store materials in accordance with the manufacturer’s written recommendations and by methods and means that will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at the Project site and overcrowding of construction spaces. In particular, the Contractor shall provide delivery and installation coordination to ensure minimum holding or storage times for materials recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.

Storage shall be arranged to provide access for inspection. The Contractor shall periodically inspect to assure materials are undamaged and are maintained under required conditions.

All costs associated with the clean-up and storage required to complete the Project shall be the sole responsibility of the Contractor.

3-12.4.2 Storage in Public Streets

The first sentence of Section 3-12.4.2 shall not be incorporated and shall instead be replaced with the following:

Construction materials and equipment shall not be stored in Streets, roads, or highways unless otherwise specified in the Special Provisions or approved by the APM.

3-13 COMPLETION, ACCEPTANCE, AND WARRANTY

3-13.1 Completion.

The Contractor shall complete all work specified in the Contract within the number of calendar days stated in the Task Order, commencing from the date of the Task Order approval form.

3-13.2 Acceptance

The Task Order will not be considered complete and ready for issuance of a Notice of Completion until all required Work under the Task Order is completed, the project site is cleaned up in accordance with Section 3-12 of Part 1 of the Standard Specifications and the Special Provisions, and all of the following items have been received by the APM:

1. A form of Notice of Completion, with all information required by the California Civil Code;
2. All written guarantees and warranties;
3. All "as-builts";
4. Duplicate copies of all operating instructions and manufacturer's operating catalogs and data, together with such field instructions as necessary to fully instruct Authority personnel in correct operation and maintenance procedures for all equipment installed listed under the electrical, air conditioning, heating, ventilating and other trades. This data and instructions shall be furnished for all equipment requiring periodic adjustments, maintenance or other operation procedures.

The Contractor shall allow at least seven (7) Calendar Days' notice for final inspection. Such notice shall be submitted to the APM in writing.

3-13.3 Warranty

For the purposes of the calculation of the start of the warranty period, the Work shall be deemed to be completed upon the date of recordation of the Notice of Completion. If that direction is contingent on the completion of any items remaining on a punch list, the Work shall be deemed to be completed upon the date of the APM's acceptance of the final item(s) on that punch list.

The Contractor shall repair or replace defective materials and workmanship as required in this Section 3-13.3 at its own expense. Additionally, the Contractor agrees to defend, indemnify and hold the Authority harmless from claims of any kind arising from damage, injury or death due to such defects.

The parties agree that no certificate given shall be conclusive evidence of the faithful performance of the Contract, either in whole or in part, and that no payment shall be construed to be in acceptance of any defective Work or improper materials. Further, the certificate or final payment shall not terminate the Contractor's obligations under the warranty herein. The Contractor agrees that payment of the amount due under the Contract and the adjustments and payments due for any Work done in accordance with any alterations of the same, shall release the Authority, the Authority Commission and its officers and employees from any and all claims or liability on account of Work performed under the Contract or any alteration thereof.

SECTION 4. CONTROL OF MATERIALS

4-1 GENERAL

The Contractor and all Subcontractors, suppliers, and vendors shall guarantee that the Work will meet all requirements of this Contract as to the quality of materials, equipment, and workmanship.

4-4 TESTING

Except as elsewhere specified, the Authority shall bear the cost of testing materials and workmanship that meet or exceed the requirements indicated in the Standard Specifications and the Special Provisions. The cost of all other tests, including the retesting of material or workmanship that fails to pass the first test, shall be borne by the Contractor.

4-6 TRADE NAMES

If the Contractor requests to substitute an equivalent item for a brand or trade name item, the burden of proof as to the comparative quality and suitability of alternative equipment or articles or materials shall be upon the Contractor, and the Contractor shall furnish, at its own expense, all information necessary or related thereto as required by the APM. All requests for substitution shall be submitted, together with all documentation necessary for the APM to determine equivalence, no later than thirty (30) Days after the issuance of Task Order, unless a different deadline is listed in the Special Provisions.

SECTION 5 LEGAL RELATIONS AND RESPONSIBILITIES

5-3 LABOR

5-3.1 Public Work

The Contractor acknowledges that the Project is a "public work" as defined in Labor Code Section 1720 *et seq.* ("Chapter 1"), and that this Project is subject to (a) Chapter 1, including without limitation Labor Code Section 1771 and (b) the rules and regulations established by the Director of Industrial Relations ("DIR") implementing such statutes. The Contractor shall perform all Work on the Project as a public work. The Contractor shall comply with and be bound by all the terms, rules and regulations described in (a) and (b) as though set forth in full herein.

5-3.2 Copies of Wage Rates

Pursuant to Labor Code Section 1773.2, copies of the prevailing rate of per diem wages for each craft, classification, or type of worker needed to perform the Project are on file at the Airport Engineering Office and will be made available to any interested party on request. By initiating any Work, the Contractor acknowledges receipt of a copy of the DIR determination of such prevailing rate of per diem wages, and the Contractor shall post such rates at each job site covered by these Contract Documents.

The Contractor shall comply with and be bound by the provisions of Labor Code Sections 1774 and 1775 concerning the payment of prevailing rates of wages to workers and the penalties for failure to pay prevailing wages. The Contractor shall, as a penalty paid to the Authority, forfeit two hundred dollars (\$200) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the DIR for the work or craft in which the worker is employed for any public work done pursuant to these Contract Documents by the Contractor or by any Subcontractor.

5-3.3 Payroll Records

The Contractor shall comply with and be bound by the provisions of Labor Code Section 1776, which requires the Contractor and each Subcontractor to (1) keep accurate payroll records and verify such records in writing under penalty of perjury, as specified in Section 1776, (2) certify and make such payroll records available for inspection as provided by Section 1776, and (3) inform the Authority of the location of the records. The Contractor has ten (10) days in which to comply subsequent to receipt of a written notice requesting these records, or as a penalty to the Authority, the Contractor shall forfeit one hundred dollars (\$100) for each Day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.

The Contractor and each Subcontractor shall comply with and be bound by the provisions of Labor Code Section 1771.4(a)(3), which requires that each Contractor and each Subcontractor shall furnish the records specified in Section 1776 directly to the Labor Commissioner at least monthly, in a format prescribed by the Labor Commissioner.

5-3.4 Hours of Labor

The Contractor acknowledges that eight (8) hours labor constitutes a legal day's work. The Contractor shall comply with and be bound by Labor Code Section 1810. The Contractor shall comply with and be bound by the provisions of Labor Code Section 1813 concerning penalties for workers who work excess hours. The Contractor shall, as a penalty paid to the Authority, forfeit twenty-five dollars (\$25) for each worker employed in the performance of this Project by the Contractor or by any Subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one calendar week in violation of the provisions of Division 2, Part 7, Chapter 1, Article 3 of the Labor Code. Pursuant to Labor Code Section 1815, work performed by employees of the Contractor in excess of eight (8) hours per day, and forty (40) hours during any one week shall be permitted upon public work upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

5-3.5 Apprentices

The Contractor shall comply with and be bound by the provisions of Labor Code Sections 1777.5, 1777.6 and 1777.7 and California Code of Regulations Title 8, Section 200 *et seq.* concerning the employment of apprentices on public works projects. The Contractor shall be responsible for compliance with these Sections for all

apprenticeable occupations. Before commencing Work on this Project, the Contractor shall provide the Authority with a copy of the information submitted to any applicable apprenticeship program. Within sixty (60) Days after concluding Work, Contractor and each of its Subcontractors shall submit to the Authority a verified statement of the journeyman and apprentice hours performed under this Contract.

5-3.6 Debarment or Suspension

The Contractor shall not perform Work with any Subcontractor that has been debarred or suspended pursuant to California Labor Code Section 1777.1 or any other federal or State law providing for the debarment of contractors from public works. The Contractor and Subcontractors shall not be debarred or suspended throughout the duration of this Contract pursuant to Labor Code Section 1777.1 or any other federal or State law providing for the debarment of contractors from public works. If the Contractor or any Subcontractor becomes debarred or suspended during the duration of the Project, the Contractor shall immediately notify the Authority.

5-3.7 Registration with the DIR

In accordance with Labor Code Sections 1725.5 and 1771.1, no contractor or subcontractor shall be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Section 1725.5.

5-3.8 Compliance Monitoring and Posting Job Sites

This Project is subject to compliance monitoring and enforcement by the DIR. The Contractor shall post job site notices, as prescribed by regulation.

5-3.9 Subcontractors

For every Subcontractor who will perform Work on the Project, the Contractor shall be responsible for such Subcontractor's compliance with Chapter 1 and Labor Code Sections 1860 and 3700, and the Contractor shall include in the written Contract between it and each Subcontractor a copy of the provisions in this Section 5-3 of the General Provisions and a requirement that each Subcontractor shall comply with those provisions. The Contractor shall be required to take all actions necessary to enforce such contractual provisions and ensure Subcontractor's compliance, including without limitation, conducting a periodic review of the certified payroll records of the Subcontractor and upon becoming aware of the failure of the Subcontractor to pay its workers the specified prevailing rate of wages. The Contractor shall diligently take corrective action to halt or rectify any failure.

5-3.10 Prevailing Wage Indemnity

To the maximum extent permitted by law, the Contractor shall indemnify, hold harmless and defend (at the Contractor's expense with counsel reasonably acceptable to the Authority) the Authority, its officials, officers, employees, agents and independent contractors serving in the role of Authority officials, and volunteers from and against any demand or claim for damages, compensation, fines, penalties or other amounts arising out of or incidental to any acts or omissions listed in Section 5-3 of the General Provisions by any Person (including the Contractor, its Subcontractors, and each of their officials, officers, employees and agents) in connection with any Work undertaken or in connection with the Contract Documents, including without limitation the payment of all consequential damages, attorneys' fees, and other related costs and expenses. All duties of the Contractor under this Section 5-3.10 shall survive expiration or termination of the Contract.

5-4 INSURANCE

5-4.1 General

The first paragraph of Section 5-4.1 of Part 1 of the Standard Specifications shall not be incorporated and shall instead be replaced with the following:

The Contractor shall provide and maintain insurance naming the Authority, its elected and appointed officials, officers, employees, attorneys, agents, designated volunteers, and independent contractors in the role of Authority officials as insureds or additional insureds regardless of any inconsistent statement in the policy or any subsequent endorsement whether liability is attributable to the Contractor or the Authority. The insurance provisions shall not be construed to limit the Contractor's indemnity obligations contained in the Contract. The Authority will not be liable for any accident, loss, or damage to the Work before completion, except as otherwise specified in Section 6-5.

The Contractor shall at all times during the term of the Contract carry, maintain, and keep in full force and effect the following insurance coverage, among other required insurance policies: (i) Workers' Compensation with a minimum limit of one million dollars (\$1,000,000) or the amount required by law, whichever is greater; and (ii) automobile insurance with a minimum limit of ten million dollars (\$10,000,000) per claim and occurrence and ten million dollars (\$10,000,000) in the aggregate for bodily injuries or death of one person and ten million dollars (\$10,000,000) for property damage arising from one incident.

5-4.2 General Liability Insurance

The Contractor shall at all times during the term of the Contract carry, maintain, and keep in full force and effect the insurance referenced in Exhibit I

5-4.2.1 Additional Insureds

The Authority, its elected and appointed officials, officers, employees, attorneys, agents, designated volunteers, and independent contractors in the role of Authority officials, shall be the insured or named as additional insureds covering the Work, regardless of any inconsistent statement in the policy or any subsequent endorsement, whether liability is attributable to the Contractor or the Authority.

5-4.2.2 No Limitation on Indemnity

The insurance provisions shall not be construed to limit the Contractor's indemnity obligations contained in these Contract Documents.

5-4.2.3 Replacement Insurance

The Contractor agrees that it will not cancel, reduce or otherwise modify the insurance coverage required by this Section 5-4 during the term of the Contract. The Contractor agrees that if it does not keep the required insurance in full force and effect, and such insurance is available at a reasonable cost, the Authority may take out the necessary insurance and pay the premium thereon, and the repayment thereof shall be deemed an obligation of the Contractor and the cost of such insurance may be deducted, at the option of the Authority, from payments due the Contractor. This shall be in addition to all other legal options available to the Authority to enforce the insurance requirements.

5-4.2.4 Certificates of Insurance with Original Endorsements

The Contractor shall submit to the Authority certificates of insurance with the original endorsements, both of which reference the same policy number, for each of the insurance policies that meet the insurance requirements, not less than one (1) day before beginning of performance under the Contract. The endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. Endorsements must be executed on forms approved by the Authority. The endorsements must specifically name the Burbank-Glendale-Pasadena Airport Authority and its elected and appointed officials, officers, employees, attorneys, agents, designated volunteers, and independent contractors in the role of Authority officials as insureds or additional insureds. Current insurance certificates and endorsements shall be kept on file with the Authority at all times during the term of this Contract. The Authority reserves the right to require complete, certified copies of all required insurance policies at any time.

5-4.2.5 Subcontractors

The Contractor shall ensure all Subcontractors and their employees are listed as additional insureds on all of the Contractor's insurance.

5-4.5 Insurance Requirements not Limiting

If the Contractor maintains broader coverage and/or higher limits than the minimums required in this Section 5-4, the Authority requires and shall be entitled to the broader coverage and/or the higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the Authority. No representation is made that the minimum insurance requirements of this Contract are sufficient to cover the obligations of the Contractor under this Contract.

5.7 SAFETY

5-7.8 Steel Plate Covers

5-7.8.1 General

The Contractor shall cover all openings, trenches and excavations at the end of each Work Day with steel plate covers.

Section 5-8 is hereby added to Section 5 of Part 1 of the Standard Specifications, as follows:

5-8 INDEMNIFICATION

5-8.1 Contractor's Duty

To the maximum extent permitted by law, the Contractor hereby agrees, at its sole cost and expense, to defend with competent defense counsel approved by the General Counsel, protect, indemnify, and hold harmless the Authority, its elected and appointed officials, officers, employees, volunteers, attorneys, agents (including those Authority agents serving as independent contractors in the role of Authority representatives), successors, and assigns (collectively "Indemnitees") from and against any and all claims (including, without limitation, claims for bodily injury, death or damage to property), demands, charges, obligations, damages, causes of action, proceedings, suits, losses, stop payment notices, judgments, fines, liens, penalties, liabilities, costs and expenses of every kind and nature whatsoever, in any manner arising out of, incident to, related to, in connection with or resulting from any act, failure to act, error or omission of the Contractor or any of its officers, agents, attorneys, servants, employees, Subcontractors, material suppliers or any of their officers, agents, servants or employees, and/or arising out of,

incident to, related to, in connection with or resulting from any term, provision, image, plan, covenant, or condition in the Contract Documents; including, without limitation, the payment of all consequential damages, attorneys' fees, experts' fees, and other related costs and expenses (individually, a "Claim," or collectively, "Claims"). The Contractor shall promptly pay and satisfy any judgment, award or decree that may be rendered against any of the Indemnitees as to any such Claim. The Contractor shall reimburse Indemnitees for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The Contractor's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by the Contractor or Indemnitees. This indemnity shall apply to all Claims regardless of whether any insurance policies are applicable or whether the Claim was caused in part or contributed to by an Indemnitees.

5-8.2 Civil Code Exception

Nothing in this Section 5-8 shall be construed to encompass Indemnitees' sole negligence or willful misconduct to the limited extent that the underlying Contract is subject to Civil Code Section 2782(a) or the Authority's active negligence to the limited extent that the underlying Contract Documents are subject to Civil Code Section 2782(b), provided such sole negligence, willful misconduct or active negligence is determined by agreement between the parties or by the findings of a court of competent jurisdiction.

5-8.3 Nonwaiver of Rights

Indemnitees do not and shall not waive any rights that they may possess against the Contractor because the acceptance by the Authority, or the deposit with the Authority, of any insurance policy or certificate required pursuant to these Contract Documents. This indemnity provision is effective regardless of any prior, concurrent, or subsequent active or passive negligence by Indemnitees and shall operate to fully indemnify Indemnitees against any such negligence.

5-8.4 Waiver of Right of Subrogation

The Contractor, on behalf of itself and all parties claiming under or through it, hereby waives all rights of subrogation and contribution against the Indemnitees, while acting within the scope of their duties, from all Claims arising out of or incident to the activities or operations performed by or on behalf of the Contractor regardless of any prior, concurrent or subsequent active or passive negligence by Indemnitees.

5-8.5 Survival

The provisions of this Section 5-8 shall survive the term and termination of the Contract, are intended to be as broad and inclusive as is permitted by the law of the State, and are in addition to any other rights or remedies that Indemnitees may have under the law. Payment is not required as a condition precedent to an Indemnitee's right to recover under this indemnity provision, and an entry of judgment against the Contractor shall be conclusive in favor of the Indemnitee's right to recover under this indemnity provision.

SECTION 6. PROSECUTION AND PROGRESS OF THE WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK

6-1.1 Construction Schedule

A construction schedule shall be submitted for each project governed by its respective Task Order. One (1) week before the scheduled pre-construction meeting, the Contractor must submit to the APM for review and approval the construction schedule required by the first paragraph of Section 6-1.1. The Contractor shall make revisions as

required by the APM. The schedule must account for all subcontract work, as well as the work of the Contractor, submittals, coordination with the other contractors performing concurrent work and the Traffic Control Plan. The Contractor shall update this Construction Schedule when directed by the APM, or when:

- a. A Change Order significantly affects the Contract completion date or the sequence of construction approach or activities; or
- b. The actual sequence of the Work, or the planned sequence of the Work, is changed and does not conform to the Contractor's current accepted Project construction schedule.

The Contractor shall submit an updated construction schedule with its monthly invoice every month. Progress payments shall be contingent upon the receipt of monthly updated construction schedules.

6-1.1.1 Pre-Construction Conference.

A pre-construction meeting shall be convened for each individual project governed by its respective Task Order. Approximately fourteen (14) Days before the commencement of Work at the site, a pre-construction conference will be held at the Airport and shall be attended by the Contractor's Project manager, its on-site field superintendent, and any Subcontractors that the Contractor deems appropriate. Attendance by the Contractor and any Subcontractors designated is mandatory.

Contractor shall submit its twenty-four (24) hour emergency telephone numbers to the APM for approval a minimum of two (2) Working Days before the pre-construction conference. Any area or utility shutdown requests shall be made at least two (2) Weeks in advance. Unless previously submitted to the APM, the Contractor shall bring to the pre-construction conference copies of each of the following:

- 1) Construction Schedule.
- 2) Procurement schedule of major equipment and materials and items requiring long lead time.
- 3) Shop drawing/sample submittal schedule.
- 4) Preliminary schedule of values (lump sum price breakdown) for progress payment purposes.
- 5) Written designation of the on-site field superintendent and the Project manager. Both daytime and emergency telephone numbers shall be included in the written designation.

The purpose of the conference is to designate responsible personnel and establish a working relationship. The parties will discuss matters requiring coordination and establish procedures for handling such matters. The complete agenda will be furnished to the Contractor before the meeting date. The Contractor shall be prepared to discuss all of the items listed below.

- 1) The Contractor's construction schedule.
- 2) Notification of the public and Airport stakeholders before starting any Work and keeping them informed throughout the Project.
- 3) Procedures for transmittal, review, and distribution of the Contractor's submittals.
- 4) Processing applications for payment.
- 5) Maintaining record documents.

- 6) Critical Work sequencing.
- 7) Maintaining sewage service during construction, including proposed by-passes.
- 8) NPDES requirements, if any
- 9) Field decisions and Change Orders.
- 10) Use of Project site, office and storage areas, security, housekeeping, and the Authority's needs.
- 11) Major equipment deliveries and priorities.
- 12) Traffic control.
- 13) Any other item that the Authority representative states is relevant to the meeting.

6-1.1.2 Weekly Progress Meetings

Progress meetings will be held each week during the course of the Project. The meeting location, day of the week and time of day will be mutually agreed to by the Authority and the Contractor. The Contractor shall provide a two (2) week "look ahead" schedule for each meeting. The APM will preside at these meetings and will prepare the meeting agenda, meeting minutes and will distribute minutes to all persons in attendance. As the Work progresses, if it is determined by agreement of the attendees, that weekly meetings are not necessary, the weekly progress meetings may be changed to bi-weekly progress meetings.

6-1.2 Commencement of the Work

The Contractor shall not begin any construction activity at the site before the issuance of the Notice to Proceed. Any Work that is done by the Contractor in advance of the Notice to Proceed shall be considered as being done at the Contractor's own risk and responsibility, and as a consequence will be subject to rejection.

Section 6-1.3 is hereby added to Section 6 of Part 1 of the Standard Specifications, as follows:

6-1.3 Working Days And Hours

Work within the AOA and the Terminal roadway system shall be conducted during nighttime hours, specifically between 10:00 p.m. and 6:00 a.m. Outside of these areas, the Contractor may perform work during the day, generally between the hours of 7:00 a.m. and 5:00 p.m. No work will be allowed on Holidays.

A permit and/or Task Order may have other hours or Days for the Contractor to do the Work, and those hours and Days shall supersede any hours and Days written in this Section.

Whenever the Contractor is permitted or directed to perform night work or to vary the period during which Work is performed during the working day, the Contractor shall give twelve (12) hours' notice to the APM so that inspection may be provided. A charge may be made to the Contractor for approved overtime or weekend inspections requested by the Contractor.

6-4 DELAYS AND EXTENSIONS OF TIME

6-4.1 General.

Unless otherwise agreed in writing, an adjustment to the Contract time by reason of a Change Order shall be agreed to at the time the Change Order is issued and accepted by Contractor. If the Change Order does not reserve the right of the parties, or either of them, to seek an adjustment to the Contract time, then the parties forever relinquish and waive such right and there shall be no further adjustments to the Contract time.

No extension of time will be granted for any event, including pandemics, leading to the issuance of a “stay at home” or similar kind of order by any local, State, or federal governmental authority, if the Work has been deemed, either by emergency order or proclamation, or operation of law, to be an essential service that is exempt from such stay at home or similar order.

6-4.2 Extensions of Time

In the event it is deemed appropriate by the Authority to extend the time for completion of the Work, any such extension shall not release any guarantee for the Work required by the Contract Documents, nor shall any such extension of time relieve or release the Sureties on the Bonds executed. In executing such Bonds, the Sureties shall be deemed to have expressly agreed to any such extensions of time. The amount of time allowed by an extension of time shall be limited to the period of the delay giving rise to the same as determined by the Authority. Notwithstanding any dispute which may arise in connection with a claim for adjustment of the Contract time, the Contractor shall promptly proceed with the Work.

6-4.3 Payment for Delays

Notwithstanding any other terms and conditions of the Contract Documents, the Authority shall have no obligation whatsoever to increase the Contract Price or extend the time for delays.

Unless compensation and/or markup is agreed upon by the Authority, the Contractor agrees that no payment of compensation of any kind shall be made to the Contractor for damages or increased overhead costs caused by any delays in the progress of the Contract, whether such delays are avoidable or unavoidable or caused by any act or omission of the Authority or its agents. Any accepted delay claim shall be fully compensated for by an extension of time to complete the performance of the Work.

This Section shall not apply to compensable delays caused solely by the Authority. If a compensable delay is caused solely by the Authority, the Contractor shall be entitled to a Change Order that: (1) extends the time for completion of the Contract by the amount of delay caused by the Authority; and (2) provides equitable adjustment, as determined by the Authority, to the Contractor.

6-8 TERMINATION OF THE CONTRACT FOR CONVENIENCE

The following sentence is added to Section 6-8:

In no event (including termination for impossibility or impracticability, due to conditions or events beyond the control of the Authority, for any other reason or for no reason) shall the total amount of money to Contractor exceed the amount which would have been paid to Contractor for the full performance of the services described in the Contract.

6-9 LIQUIDATED DAMAGES

For the purposes of the calculation of the start of the liquidated damages, the Work shall be deemed to be completed when the Work is completed in accordance with the Plans and Specifications, and to the satisfaction of the APM, and the APM has certified such completion in accordance with Section 3-13.1 of Part 1 of the Standard Specifications.

SECTION 7. MEASUREMENT AND PAYMENT

7.3 PAYMENT

7.3.1 General

The unit and lump sum prices to be paid shall constitute full compensation for all labor, equipment, materials, tools and incidentals required to complete the Task Orders as outlined in these Contract Documents and as directed by the APM. In accordance with Public Contract Code Section 7107, if no claims have been filed and are still pending, the amount deducted from the final estimate and retained by the Authority will be paid to the Contractor except such amounts as are required by law to be withheld by properly executed and filed notices to stop payment, or as may be withheld for any other lawful purposes.

7-3.2 Partial and Final Payment

7-3.2.1 Monthly Closure Date and Invoice Date

For purposes of Section 7-3.2, the monthly closure date shall be the last Day of each month. A measurement of Work performed and a progress estimate of the value thereof based on the Contract and of the monthly payment shall be prepared by the Contractor and submitted to the APM before the tenth (10th) Day of the following month for verification and payment consideration.

7-3.2.2 Payments

The Authority shall make payments within thirty (30) Days after receipt of the Contractor's undisputed and properly submitted payment request and all associated documents, including an updated construction schedule pursuant to Section 6-1.1 of the General Provisions. The Authority shall return to the Contractor any payment request determined not to be a proper payment request as soon as practicable, but not later than seven (7) Days after receipt, and shall explain in writing the reasons why the payment request is not proper.

7-3.2.3 Retention

The Authority shall withhold not less than five percent (5%) from each progress payment. However, at any time after fifty percent (50%) of the Work has been completed, if the Authority Commission finds that satisfactory progress is being made, it may, at its discretion, make any of the remaining progress payments in full for actual Work completed. The Authority shall withhold not less than five percent (5%) of the Contract Price from the Final Payment Amount (defined in Section 7-3.2.4) until at least thirty-five (35) days after recordation of the Notice of Completion, or recordation of a notice of completion or cessation, but not later than the period permitted by Public Contract Code Section 7107.

7-3.2.4 Final Invoice and Payment

Whenever the Contractor shall have completely performed the Contract in the opinion of the APM, the APM shall notify the Sr. Manager, Engineering and Project Delivery that the Contract has been completed in its entirety. The Contractor shall then submit to the APM a written statement of the final quantities of Contract items for inclusion

in the final invoice. Upon receipt of such statement, the APM shall check the quantities included therein and shall authorize a payment amount, which in the APM's opinion shall be just and fair, covering the value of the total amount of Work done by the Contractor, less all previous payments and all amounts to be retained under the provisions of the Contract Documents ("Final Payment Amount"). The APM shall then request that the Authority accept the Work and that the Sr. Manager, Engineering and Project Delivery be authorized to file, on behalf of the Authority in the office of the County Recorder, a Notice of Completion of the Work herein agreed to be done by the Contractor. In addition, the final payment will not be released until the Contractor returns the control set of Plans and Specifications showing the redlined as-built conditions.

7-3.2.5 Substitute Security

In accordance with Public Contract Code Section 22300, the Contractor may request that it be permitted to substitute securities in lieu of having retention withheld by the Authority from progress payments when such payments become due or, in the alternative, the Contractor may request that the Authority make payments of earned retentions directly to an agreed upon designated escrow agent at the Contractor's expense. If the Contractor selects either one of these alternatives, the following shall control.

7.3.2.5.1 Substitution of Securities for Performance Retention

At some reasonable time before any progress payment would otherwise be due and payable to the Contractor in the performance of Work under these Contract Documents, the Contractor may submit a request to the Authority in writing to permit the substitution of retentions with securities equivalent to the amount estimated by the Authority ("estimated amount of retention") to be withheld. The Contractor shall deposit such securities with the Authority or may, in the alternative, deposit such securities in escrow with a State or federally chartered bank in California, as the escrow agent, at the Contractor's expense. Such securities will be the equivalent or greater in value of the estimated amount of retention. If the Contract is modified by written Modifications or Change Orders or the Contractor otherwise becomes entitled to receive an amount more than the Contract Price at the time the securities are deposited, the Contractor shall, at the request of the Authority, deposit with the Authority or escrow agent, whichever is applicable, additional securities within a reasonable time so that the amount of securities on deposit with the Authority or escrow agent is equivalent or greater in value than the amount of retention the Authority would otherwise be entitled to withhold from progress payments due or to become due to the Contractor as the Work progresses. The Authority shall withhold any retention amount that exceeds the security amount until the additional securities are deposited and, if the deposit is with an escrow agent, the Authority has confirmation from that escrow agent of the new total value of securities. Upon satisfactory completion of the Contract, which shall mean, among other things, that the Authority is not otherwise entitled to retain proceeds from progress payments as elsewhere provided in the Contract or under applicable law, the securities shall be returned to the Contractor. The Authority shall, within its sole discretion, determine whether the amount of the securities on deposit with the Authority or escrow agent is equal to or greater than the amount of estimated retention of progress payments that could otherwise be held by the Authority if the Contractor had not elected to substitute same with securities.

7-3.2.5.2 Deposit of Retention Proceeds with an Escrow Agent

As an alternative to the substitution of securities, as provided above, or the Authority otherwise retaining and holding retention proceeds from progress payments, the Contractor may request the Authority to make payments of retentions earned directly to an escrow agent with the same qualifications as required in Section 7-3.2.5.1 above and at the expense of the Contractor. At its sole expense, the Contractor may direct the investment of such retention payments into only such securities as mentioned in Section 7-3.2.5.4 below and shall be entitled to interest earned on such investments on the same terms provided for securities deposited by the Contractor. Upon satisfactory completion of the Contract, which shall mean when the Authority would not otherwise be entitled to withhold

retention proceeds from progress payments had the Contractor not elected to have such proceeds deposited into escrow, the Contractor shall be allowed to receive from the escrow agent all securities, interest and payments deposited into escrow pursuant to the terms of this Section. The Contractor shall pay to each Subcontractor, not later than ten (10) Days of receipt of payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount withheld to ensure performance of the Contractor.

7-3.2.5.3 Subcontractor Entitlement to Interest

If the Contractor elects to receive interest on any moneys withheld in retention by the Authority, then the Subcontractor shall receive the identical rate of interest received by the Contractor on any retention moneys withheld from the Subcontractor by the Contractor, less any actual pro rata costs associated with administering and calculating that interest. In the event that the interest rate is a fluctuating rate, the rate for the Subcontractor shall be determined by calculating the interest rate paid during the time that retentions were withheld from the Subcontractor. If the Contractor elects to substitute securities in lieu of retention, then, by mutual consent of the Contractor and the Subcontractor, the Subcontractor may substitute securities in exchange for the release of moneys held in retention by the Contractor. The Contractor shall pay each Subcontractor, not later than ten (10) Days after receipt of escrow moneys, the amount owed to each Subcontractor from the moneys plus the respective amount of interest earned, net of costs attributed to the retention held from each Subcontractor, on the amount of retention withheld to ensure performance of the Subcontractor.

7-3.2.5.4 Securities Eligible for Investment

Securities eligible for investment shall include those listed in Government Code Section 16430, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed upon between the Contractor and the Authority. The Contractor shall be the beneficial owner of any securities substituted for any monies withheld and shall receive any interest thereon.

7-3.2.5.5 Escrow Agreement for Security Deposits in Lieu of Retention

The escrow agreement that shall be used for the deposit of securities in lieu of retention shall substantially conform to the form prescribed in Public Contract Code Section 22300(f).

7-3.2.5.6 Inconsistencies with Prevailing Statutory Requirements

If there is any inconsistency between or differences in Public Contract Code Section 22300 and the terms of this provision, or any future amendments thereto, Section 22300 shall control.

Section 7-3.9 is hereby added to Section 7-3 of Part 1 of the Standard Specifications, as follows:

7-3.9 AUDIT

The Authority or its representative shall have the option of inspecting and/or auditing all records and other written materials used by the Contractor in preparing its billings to the Authority as a condition precedent to any payment to the Contractor or in response to a construction claim or a Public Records Act (Government Code Section 6250 *et seq.*) request. The Contractor will promptly furnish documents requested by the Authority at no cost. Additionally, the Contractor shall be subject to State Auditor examination and audit at the request of the Authority or as part of any audit of the Authority, for a period of three (3) years after final payment under the Contract. The Contractor shall include a copy of this Section 7-3.9 in all contracts with its Subcontractors, and the Contractor shall be responsible for immediately obtaining those records or other written material from its Subcontractors upon a

request by the State Auditor or the Authority. If the Project includes other auditing requirements, those additional requirements will be listed in the Special Provisions.

SECTION 8. FACILITIES FOR AGENCY PERSONNEL

8-1 General

No field offices for Authority personnel shall be required; however, Authority personnel shall have the right to enter upon the Project at all times and shall be admitted to the offices of the Contractor to use the telephone, desk and sanitary facilities provided by the Contractor for its own personnel.

SECTION 9. ADDITIONAL TERMS

9-1 NONDISCRIMINATORY EMPLOYMENT

The Contractor shall not unlawfully discriminate against any individual based on race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation or military and veteran status. The Contractor understands and agrees that it is bound by and will comply with the nondiscrimination mandates of all statutes and local ordinances and regulations.

9-3 CONTRACTOR'S RESPONSIBILITY FOR WORK

Until the final acceptance of the Work by the Authority Commission in accordance with Section 3-13.2 of the General Provisions, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part of the Work by the action of the elements, criminal acts, or any other cause. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the Work occasioned by any cause before its completion and acceptance and shall bear the expense thereof, except for such injuries or damages arising from the sole negligence or willful misconduct of the Authority, its officers, agents or employees. In the case of suspension of Work from any cause whatever, the Contractor shall be responsible for all materials and the protection of Work already completed, shall properly store and protect them if necessary, and shall provide suitable drainage and erect temporary structures where necessary.

9-4 PROCEDURE IN CASE OF DAMAGE TO PUBLIC PROPERTY

Any portions of curb, gutter, sidewalk or any other Authority improvement damaged by the Contractor during the course of construction shall be replaced by the Contractor at its own cost. The cost of additional replacement of curb, gutter or sidewalk in excess of the estimated quantities shown in the Bid form and Specifications, and found necessary during the process of construction (but not due to damage resulting from carelessness on the part of the Contractor during its operation), shall be paid to the Contractor at the unit prices submitted in his or her Bid.

9-5 REMOVAL OF INTERFERING OBSTRUCTIONS

The Contractor shall remove and dispose of all debris, abandoned structures, tree roots and obstructions of any character encountered during the process of excavation. It is understood that the cost of any such removals are made a part of the unit price bid by the Contractor under the item for excavation or removal of existing Work.

9-6 SOILS ENGINEERING AND TESTING

A certified materials testing firm may be retained by the Authority to perform materials tests during the Contractor's entire operation to ascertain compliance with the Contract requirements. The Authority shall be responsible for the first series of tests. If the initial tests do not meet the Contract requirements, the Contractor shall bear the cost of all subsequent tests.

If the Authority requires other tests or more specific requirements for testing regarding this Project, those details will be included in the Special Provisions.

9-7 ACCESS TO PRIVATE PROPERTY

Unless otherwise stated in the Special Provisions, the Contractor shall be responsible for all fees and costs associated with securing permission to access private property for any portion of the Project.

9-9 CLAIM DISPUTE RESOLUTION

In the event of any dispute or controversy with the Authority over any matter whatsoever, the Contractor shall not cause any delay or cessation in or of Work, but shall proceed with the performance of the Work in dispute. The Contractor shall retain any and all rights provided that pertain to the resolution of disputes and protests between the parties. The disputed Work will be categorized as an "unresolved dispute" and payment, if any, shall be as later determined by mutual agreement or a court of law. The Contractor shall keep accurate, detailed records of all disputed Work, claims and other disputed matters.

All claims arising out of or related to the Contract Documents or this Project, and the consideration and payment of such claims, are subject to Public Contract Code Section 9204 and Public Contract Code Section 20104 et seq. (Article 1.5), where applicable. This Contract hereby incorporates those provisions as though fully set forth herein. For purposes of this Section, "claim" means a separate demand by the Contractor sent by registered mail or certified mail with return receipt requested, for (i) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the Authority, (ii) payment by the Authority of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract Documents, payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled, or (iii) payment of an amount that is disputed by the Authority. The Contractor or any Subcontractor must file a claim in accordance with Section 9204 and Article 1.5 (if applicable), and must then adhere to Section 9204 and Article 1.5 (as applicable).

In addition to compliance with Public Contract Code Section 9204 and Article 1.5, filing a claim in accordance with the Government Claims Act (Government Code Section 810 et seq.) is a prerequisite to filing any lawsuit against the Authority relating to this Contract.

9-10 THIRD PARTY CLAIMS

The Authority shall have full authority to compromise or otherwise settle any claim relating to the Project at any time. The Authority shall timely notify the Contractor of the receipt of any third-party claim relating to the Project. The Authority shall be entitled to recover its reasonable costs incurred in providing this notice.

9-11 COMPLIANCE WITH LAWS

The Contractor shall comply with all applicable federal, State and local laws, ordinances, codes and regulations in force at the time the Contractor performs pursuant to the Contract Documents.

9-12 CONTRACTOR'S REPRESENTATIONS

By signing the Contract, the Contractor represents, covenants, agrees, and declares under penalty of perjury under the laws of the State of California that: (a) the Contractor is licensed, qualified, and capable of furnishing the labor, materials, and expertise necessary to perform the services in accordance with the terms and conditions set forth in the Contract Documents; (b) there are no obligations, commitments, or impediments of any kind that will limit or prevent its full performance under the Contract Documents; (c) there is no litigation pending against the Contractor that could adversely affect its performance of the Contract, and the Contractor is not the subject of any criminal investigation or proceeding; and (d) to the Contractor's actual knowledge, neither the Contractor nor its personnel have been convicted of a felony.

9-13 CONFLICTS OF INTEREST

The Contractor agrees not to accept any employment or representation during the term of the Contract or within twelve (12) months after acceptance as defined in Section 3-13.2 of the General Provisions that is or may likely make the Contractor "financially interested," as provided in Government Code Sections 1090 and 87100, in any decisions made by the Authority on any matter in connection with which the Contractor has been retained pursuant to the Contract Documents.

9-14 APPLICABLE LAW

The validity, interpretation, and performance of these Contract Documents shall be controlled by and construed under the laws of the State of California, excluding California's choice of law rules. Venue for any such action relating to the Contract shall be in the Superior Court with geographic jurisdiction over the Authority.

9-15 TIME

Time is of the essence in these Contract Documents.

9-16 INDEPENDENT CONTRACTOR

The Contractor and Subcontractors shall at all times remain, as to the Authority, wholly independent contractors. Neither the Authority nor any of its officials, officers, employees or agents shall have control over the conduct of the Contractor, Subcontractors, or any of their officers, employees, or agents, except as herein set forth, and the Contractor and Subcontractors are free to dispose of all portions of their time and activities that they are not obligated to devote to the Authority in such a manner and to such Persons that the Contractor or Subcontractors wish except as expressly provided in these Contract Documents. The Contractor and Subcontractors shall have no power to incur any debt, obligation, or liability on behalf of the Authority, bind the Authority in any manner, or otherwise act on behalf of the Authority as agents. The Contractor and Subcontractors shall not, at any time or in any manner, represent that they or any of their agents, servants or employees, are in any manner agents, servants or employees of the Authority. The Contractor and Subcontractors agree to pay all required taxes on amounts paid to them under the Contract, and to indemnify and hold the Authority harmless from any and all taxes, assessments, penalties, and interest asserted against the Authority by reason of the independent contractor relationship created by the Contract Documents. The Contractor shall include this provision in all contracts with all Subcontractors.

9-17 CONSTRUCTION

In the event of any asserted ambiguity in, or dispute regarding the interpretation of any matter herein, the interpretation of these Contract Documents shall not be resolved by any rules of interpretation providing for interpretation against the party who causes the uncertainty to exist or against the party who drafted the Contract Documents or who drafted that portion of the Contract Documents.

9-18 NON-WAIVER OF TERMS, RIGHTS AND REMEDIES

Waiver by either party of any one (1) or more of the conditions of performance under these Contract Documents shall not be a waiver of any other condition of performance under these Contract Documents. In no event shall the making by the Authority of any payment to the Contractor constitute or be construed as a waiver by the Authority of any breach of covenant, or any default that may then exist on the part of the Contractor, and the making of any such payment by the Authority shall in no way impair or prejudice any right or remedy available to the Authority with regard to such breach or default.

9-19 TERM

The Contract is effective as of the Effective Date listed, and shall remain in full force and effect until the Contractor has fully rendered the services required by the Contract Documents or the Contract has been otherwise terminated by the Authority. However, some provisions may survive the term listed within this Section, as stated in those provisions.

9-20 NOTICE

Except as otherwise required by law, any notice or other communication authorized or required by these Contract Documents shall be in writing and shall be deemed received on (a) the day of delivery if delivered by hand or overnight courier service during the Authority's regular business hours or (b) on the third (3rd) business day following deposit in the United States mail, postage prepaid, to the addresses listed on the Contractor's Bid and to the Airport Engineering Office, or at such other address as one party may notify the other.

9-21 SEVERABILITY

If any term or portion of these Contract Documents is held to be invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions of these Contract Documents shall continue in full force and effect.

END OF GENERAL PROVISIONS

EXHIBIT F

SPECIAL PROVISIONS

(attached)

SPECIAL PROVISIONS

SECTION 1. LIQUIDATED DAMAGES

1-01 Project Completion

If the Contractor fails to complete the Work within the period specified in Section 6-9 of the General Conditions and Section 3-13.1 of the Standard Specifications, then the Contractor shall pay the Authority the sum of \$1,000 per day as liquidated damages (but not as a penalty) for each consecutive Day (or portion of a Day) after expiration of such period until the Work is completed, as determined by the APM.

1-02 Runway/Night Work Area Operations

The Contractor shall pay the Authority as liquidated damages (but not as a penalty): (i) the sum of Five Thousand Dollars (\$5,000) for the first fifteen (15) minute period of each morning that a runway or identified night work area is not opened for operations at the listed time; (ii) an additional Five Thousand Dollars (\$5,000) for the second fifteen (15) minute period of each morning that a runway or identified night work area is not opened at the listed time; and (iii) an additional Fifty Thousand Dollars (\$50,000) per hour (or portion of an hour) thereafter of each morning that a runway or identified night work area is not opened for operations at the listed time.

1-03 Incursions

The Contractor shall confine its apparatus, the storage of materials and the operations of its workmen to limits indicated by law and directions of the APM. The Contractor shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety. Access on or near runways, taxiways, or the Security Identification Display Area ("SIDA") is absolutely prohibited, except with continuous escort by an authorized agent of the Authority. The Contractor shall pay the Authority as liquidated damages (but not as a penalty) the sum of Five Thousand Dollars (\$5,000) per instance of unapproved vehicular incursion or access on a runway, taxiway, or SIDA. This provision is limited to damages for disruption in airport operations and/or security. This provision shall not apply to any damages to property or personal injury arising out of any incursion, and the Contractor shall be fully liable for the full amount of all of such damages.

1-04 Traffic Safety

The Contractor shall keep the work site, and adjacent areas, in a neat, clean and orderly manner. If there exists a situation which is deemed unsafe for vehicle or pedestrian traffic, the APM may stop the Work and order the appropriate corrective action at no additional expense to the Authority. If the Contractor fails to remedy the deficiency in a reasonable time frame, the Authority may clean or make whatever changes are necessary to the site using its own forces, and may charge the Contractor for associated expenses. In addition, the Contractor shall pay the Authority as liquidated damages (but not as a penalty) the sum of One Hundred Dollars (\$100.00) per hour until the remediation work is complete.

1-05 Acknowledgements

Liquidated damages are cumulative for each item. The Authority shall not be liable to the Contractor or any Subcontractor for any losses or damages incurred by the Contractor or any such Subcontractor arising from the Contractor's, or any such Subcontractor's inability to complete the Work prior to the expiration of the construction period.

The parties agree that the Authority would suffer substantial damages as the result of any delays by the Contractor in completing the items described above within the applicable time periods specified above, and that it would be impracticable or extremely difficult to fix the actual amount of damages caused by such delays. Therefore, the parties agree that the above amounts are reasonable approximations of the actual damages to be suffered by the Authority by reason of any such delays.

SECTION 2. FIELD ACCESS IDENTIFICATION PROGRAM

2-01 Applications

The following information must be provided to the Authority before any type of field access badge may be issued:

1. List of company officials with samples of its signatures who may authorize production of new badges and the reissue of expired badges.
2. Company phone numbers for verification purposes.
3. List of all employees and dates of hire who will need field/ramp access I.D. cards.
4. A brief description of the area where access is required.
5. All employees requiring unescorted access and vehicle driving privileges to the worksite must submit to a criminal history records check a minimum of two weeks prior to the project start date. Applicants who successfully complete the criminal history check will need to schedule a two hour airport security and driver's training class with Airport Operations. Applicants will be badged upon successful completion of this class and will be eligible to escort other employees on the work site.

The Contractor shall bear all expense associated with processing employees through the Criminal History Records Check and Badging (currently \$60/ Applicant, fingerprinting \$30/ Applicant). Contact the Administrative Specialist at (818) 840-8833 for more information.

6. An applicant information form approved by the manager listed in item (1) one for each employee.

Employees that are approved to have an I.D. card must show a current Driver's License before processing can begin.

Photos for I.D. cards are taken Monday through Friday 8:00 a.m.. to 4:00 p.m., and will be issued at that time.

At the completion of the project all badges issued to contractor or subcontractor shall be returned to Airport Operations. Failure to return the Identification Badge will result in forfeiture of retention payment in the amount of \$150.00 per badge not returned.

2-02

The Contractor will have a specified number of access points to the AOA dependent upon its work area. The Contractor is responsible for the security of specified AOA access points. If the Contractor wishes to use a gate guard to secure a gate, the guard must be badged under the responsibility of the Contractor. If at any time, airport security of the gate is compromised because of Contractor or a Subcontractor personnel's dereliction of duty, the Project will be shut-down until investigation is complete and the Operations Department Representative instructs personnel to resume construction activity. The Contractor and Subcontractor personnel must abide by Airport, FAA, TSA, NPDES stormwater permit requirements, AQMD air quality requirements, local laws, rules and regulations.

failures to do so will subject the individual to Violation Enforcement Program established by the Authority and possible criminal prosecution.

2-03 Vehicles

Gate access and driving privileges on the AOA must be approved by the APM or his/her designated representative. The field driving privilege is contingent upon compliance with all rules and regulations as stipulated by the Authority. Infractions of the Motor Vehicle Rules and Regulations of the Authority will result in an immediate escort off of airport property and may result in the assessment of runway/taxiway incursion liquidated damages, as specified above.

SECTION 3. REQUIRED SECURITY TRAINING

Any project involving access to the Security Identification Display Area (“SIDA”) requires the following:

1. Security training pursuant to Federal Aviation Regulation 107.25 must be received by sufficient personnel to ensure that at least one individual who has received the training is present at the job site at all times.
2. Security training is offered by Airport Operations and can be coordinated by contacting the Manager, Airport Operations or an Operations Duty Supervisor.

SECTION 4. AIRPORT REGULATIONS and REQUIREMENTS

The Contractor shall abide by the rules, regulations and requirements of the Authority relating to access to and protection of property. The Contractor shall also abide by the directions of the APM, as well as by applicable regulations of the FAA.

4-1 Clean Construction Policy:

The Contractor shall comply with Hollywood Burbank Airport’s Clean Construction Policy, which is provided as an attachment to this document. The Contractor shall complete the table below with the required information and submit it to the APM.

Construction projects larger than one acre are required to file a Notice of Intent (NOI) with the Water Board through the Storm Water Multiple Application and Report Tracking System (SMARTS) system. Contractor must also submit a Storm Water Pollution Prevention Plan (SWPPP) to the Airport and designate a Qualified SWPPP Practitioner (QSP) for the project. The contractor is responsible for completing the NOI application, paying the associated fee, and submitting all required documentation, including inspection reports, water sampling results if applicable, annual reports, and a Notice of Termination (NOT) at the conclusion of the project.

SECTION 5. FIELD ENGINEERING

The Contractor shall provide and pay for field engineering services required by the Contractor for the Project. It shall include survey work and other professional engineering services specified or required to execute the Contractor's construction methods. The APM will identify existing control points indicated on the drawings or as required. All control points shall be preserved during the Project. If any points are disturbed by the Contractor, the Contractor shall reestablish them at its own cost. The Contractor shall maintain a complete and accurate log of all control and survey work as it progresses.

SECTION 6. QUALITY CONTROL/QUALITY ASSURANCE

6-01 Quality Control

Quality Control is the inspection, analysis, and control over what is being done, manufactured, or fabricated, so that the specified level of quality is achieved and maintained. The Contractor has the sole responsibility for all Quality Control of the work. The Contractor shall hire and pay for an independent firm that will perform inspections, tests, and other quality control services required by the APM. Employment of testing laboratory shall in no way relieve Contractor of its obligation to perform Work in accordance with requirements of Contract Documents.

6-02 Quality Assurance

Quality Assurance is the inspection, testing, and other relevant actions taken by an owner or its representative to ensure that the desired level of quality is in accordance with the applicable standards or specifications for the product or work. The Authority will test or observe at its discretion to see that the specified standards of the specifications and Governing Agencies are met by the Contractor.

SECTION 7. SAFETY

7-01 General

The provisions of this safety and security plan and associated procedures are applicable within the boundaries of the Airport. A complete understanding of all procedures and requirements contained herein is required to ensure safety during construction. This safety plan is a part of this Agreement and deviations from the requirements established herein will be sufficient cause for contract termination.

Required reference material associated with this safety plan includes:

FAA AC 150/5200 18C, Airport Safety Self-Inspection

FAA AC 150/5210-5D, Painting, Marking and Lighting of Vehicles Used on an Airport

FAA AC 150/5370 10H, Operational Safety on Airports During Construction

FAA AC 150/5370-13A, Off peak Construction of Airports Using Hot-Mix Asphalt

Copies of these documents are available on the FAA website:
https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.list/parentTopicID/11.

7-02 Contractor Safety Officer Appointment

The Contractor shall appoint its on-site Construction Superintendent or other qualified individual(s) as its duly authorized representative to serve as Contractor Safety officer (CSO) for the duration of the contract. The CSO shall thoroughly understand the safety and security requirements of this Agreement, the necessity for them and shall have sufficient authority to implement its provisions without significant deviation. The Contractor shall notify the APM in writing of the name of the individual(s) selected for the assignment.

The CSO shall represent the Contractor on safety and security requirements compliance. The CSO shall be especially knowledgeable regarding the requirements of FAA AC's 150/5200 18, Airport Self Inspection Guide and 150/5370 2 Operational Safety on Airports During Construction, latest edition.

7-03 Contractor Safety Officer Responsibilities

Prior to the desired date for commencement of the Work, the CSO shall accomplish the following:

1. Develop and submit in writing a detailed work sequence schedule with dates and times specified for all milestone events. This sequence schedule shall conform, as a minimum, to the events specified in Section 7-04 below, and shall be subject to the approval of the APM. To assure adequate time for coordination, this document shall be submitted at least one week prior to the date of the preconstruction conference.
2. Develop and submit in writing a detailed outline of the procedures to be followed to maintain safety and security of both Contractor operations and the integrity of airport landside and airside operations during the prosecution of contract work. This plan shall detail, in addition, the procedures to be followed in the event of an accident or fire involving Contractor personnel and the Contractor's efforts to maintain fire protection and security. These procedures shall be subject to the approval of the APM and reflect any change as may be deemed necessary.
3. Conduct at least one meeting of all Contractor supervisory personnel prior to the start of the Work. The purpose of this meeting is to review the approved work sequence schedule and safety and security procedures. Attendance at this meeting by the CSO, all Contractor supervisory personnel and the APM is mandatory. This meeting shall also be open to other employees of the Contractor and others as the APM may deem appropriate. Minutes of this meeting shall be taken by the CSO, copies provided to each supervisor and kept on file in the Contractor's construction office for periodic review and updating.
4. Develop a safety and security orientation program and provide a briefing for all employees of the Contractor and Subcontractors that will be used on the project. A similar briefing will be given to new employees prior to their use on the Work. In addition, the CSO shall be responsible for briefing, from time to time, all Contractor personnel on any changes to safety and security measures deemed necessary.

7-04 Construction Sequencing

The Contractor shall prepare a construction schedule and submit to the APM at least two weeks prior to the preconstruction conference.

The Contractor shall acquaint its supervisors and employees with the sequence of construction and the relationship to airport activity and aircraft operations that are inherent to this airport. No runway, taxiway, apron or airport roadway shall be closed without the written approval of the APM, to enable necessary NOTAMS and/or advisories to airport fixed based operators, tenants and users. NOTAM requests shall be submitted a minimum of two weeks prior to the required NOTAM implementation.

The Contractor shall contact the APM a minimum of ten (10) days prior to any requested closing.

Construction safety limits in active airport areas are governed by FAA standards to maintain obstacle-free zones around runways and taxiways. The **Runway Safety Area (RSA)** must remain completely clear during operations, typically extending 250 ft from the runway centerline and 1,000 ft beyond each end, with no construction allowed unless the runway is closed. The **Runway Object Free Area (ROFA)**, about 400 ft from the centerline, permits limited work under strict controls, requiring frangible barricades and no permanent objects. For taxiways, the **Taxiway Safety Area (TSA)** and **Taxiway Object Free Area (TOFA)** allow controlled construction only when hazards are mitigated and equipment is removed daily. All activities must follow an FAA-approved Construction Safety and Phasing Plan (CSPP), use proper barricades and lighting, and restore safety areas before reopening.

These limits are primarily defined in **FAA AC 150/5300-13B (Airport Design)** and **AC 150/5370-2G (Operational Safety During Construction)**.

The APM will arrange for an inspection prior to return to service of any facility, that has been closed for work, on or adjacent thereto, or that has been used for a crossing point or haul route by the Contractor.

7-05 Marking and Lighting

Proper marking and lighting of areas on the airfield associated with the construction shall be the responsibility of the Contractor. Contractor shall provide all required light towers, lighted X(s), and place them in the required locations as depicted in the approved work plans for each Task Order. This will include properly marking and lighting closed runways, taxiways, taxilanes, and aprons, the limits of construction, material storage areas, equipment storage areas, haul routes, parking areas and other areas defined as required for the Contractor's exclusive use. The Contractor shall erect and maintain around the perimeter of these areas suitable marking and warning devices visible for day and night use. Temporary barricades, flagging, and flashing warning lights shall be required at critical access points. The type and location of marking and warning devices will be approved by the APM.

Special emphasis shall be given to open trenches, excavations, heavy equipment marshalling areas, and stockpiled material located in the airport operations area, which shall be predominantly marked by the Contractor with flags and lighted by approved light units during hours of restricted visibility and darkness. All marking shall be in accordance with FAA Advisory Circular (AC) 150/5340 1J or latest edition.

7-06 Traffic Control

The Contractor shall establish and maintain a list of Contractor and subcontractor vehicles authorized to operate on the site. Contractor employee vehicles shall be restricted to the Contractor's staging area and are not allowed in the AOA at any time. To be authorized to operate on the airport, each Contractor or subcontractor's vehicle shall:

1. Be marked/flagged for high daytime visibility and lighted for nighttime operations. Vehicles that are not marked and/or lighted shall be escorted by a vehicle appropriately marked and/or lighted. Vehicles requiring escort shall be identified on the list.
2. Be identified with the name and/or logo of the Contractor and be of sufficient size to be identified at a distance. Vehicles needing intermittent identification could be marked with tape or with commercially available magnetically attached markers. Vehicles that are not appropriately identified shall be escorted by a vehicle that conforms to this requirement. Vehicles requiring escort shall be identified on the list.
3. Be operated in a manner that does not compromise the safety of either landside or airside airport operations. If, in the opinion of the APM, any vehicle is operated in a manner not fully consistent with this requirement, the APM has the right to restrict operation of the vehicle or prohibit its use on the airport.

7-07 Construction Site Access.

The Contractor's access to the site will be described in the Task Order. No other access points shall be allowed unless approved by the APM. All Contractor traffic authorized to enter the site shall be experienced in the route or guided by Contractor personnel. The Contractor shall be responsible for traffic control to and from the various construction areas on the site, and for the operation and security of the access gate to the site. A Contractor's flagman or traffic control person shall monitor and coordinate all Contractor traffic at the access gate with Airport Security. The Contractor shall not permit any unauthorized construction personnel or traffic on the site. Access

gates to the site shall be locked and secured at all times when not attended by the Contractor. If the Contractor chooses to leave any access gate open, it shall be attended by Contractor personnel who are familiar with the requirements of the Airport Security Program. The Contractor is responsible for the immediate cleanup of any debris deposited along the access route as a result of his construction traffic. Directional signing from the access gate along the delivery route to the storage area, plant site or work site shall be as directed by the APM. In addition, the following requirements are applicable:

1. All Contractor traffic authorized to travel on the airport shall have been briefed as part of the Contractor's construction safety and security orientation program, be thoroughly familiar with the access procedures and route for travel or be escorted by personnel authorized by the CSO.
2. The Contractor shall install work site identification signs at the authorized access point(s). If, in the opinion of the APM, directional signs are needed for clarity, they shall be installed along the route authorized for access to each construction site.
3. Under no circumstance will Contractor personnel be permitted to drive their individually owned vehicles to any construction site on the airport. All vehicles must be parked in the area designated for employee parking and out of secured airport property.
4. In addition to the inspection and cleanup required at the end of each shift, the Contractor is responsible for the immediate cleanup of any debris generated along the construction site access route(s) as a result of construction related traffic or operations whether or not created by Contractor personnel.

7-08 Material Suppliers

All material suppliers, subcontractors and visitors to the work site are obligated to follow the same safety and security operating procedures as the Contractor. All material suppliers shall make their deliveries using the same access points and routes as the Contractor and shall be advised of the appropriate delivery procedures at the time the materials order is placed. The Contractor shall not use the Airport address for any delivery but shall use the street address appropriate to the location of the entrance of the work site. If it is not practical to conform to the vehicle identification requirements and the safety and security operations program requirements, the Contractor shall be prepared to escort all suppliers, subcontractors and visitors while they are on the airport.

7-09 Personnel Identification.

All employees, agents, vendors, invitees, etc. of the Contractor or subcontractors requiring access to the construction site shall, conform to the Security Program. The Contractor is required to remove all materials and equipment not approved to stay within the work area at the end of each shift. At the end of the project all badges issued to personnel necessary to facilitate the Work shall be returned to the Authority prior to final payment.

7-10 General Safety Requirement

Contractor shall comply with all applicable federal, state, and local laws, regulations, and airport-specific rules governing construction activities within the Airport Operations Area (AOA). This includes adherence to FAA Advisory Circulars, Part 139 Certification requirements, and the Airport's Rules and Regulations regarding safety, security, environmental protection, and operational integrity. The Contractor shall implement and maintain an FAA-approved Construction Safety and Phasing Plan (CSPP) and Safety Plan Compliance Document (SPCD) throughout the project. All personnel, equipment, and materials must conform to airport access control procedures, marking

and lighting standards, and operational safety protocols. Any deviation from these requirements must receive prior written approval from the Airport Authority and, where applicable, the FAA

All Contractor vehicles that are authorized to operate on the airport outside of the designated construction area limits or haul routes as defined herein shall display in full view above the vehicle a flashing amber (yellow) dome-type light or a three foot by three foot, or larger, orange and white checkerboard flag, each checkerboard color being one foot square. Vehicles must be under control of a contractor mobile (two-way) radio operator (flagmen) monitoring the Airport frequency. Vehicle operators must be vigilant about conflict with any aircraft and give way to any operating aircraft.

All Contractor vehicles that are required to operate outside of the construction area limits as defined herein and cross active runways, taxiways, aprons, or runway approach clear zones shall do so under the direct control of a flagman who is monitoring the Airport frequency. Flagmen and two-way radios shall be furnished by the Contractor. Flagmen shall be instructed in the use of two-way radios prior to use. All aircraft traffic on runways, taxiways and aprons shall have priority over Contractor's traffic.

Construction vehicles not in use for extended periods during the workday, or during nights and weekends (nonwork periods) shall be parked away from active runways, taxiways, and aprons in designated vehicle marshalling areas.

In order to protect all aircraft traffic, aviation related businesses, terminal apron areas, etc. from potential damage caused by foreign object debris ("FOD") generated by construction activities, the Contractor shall provide a vacuum truck as required at the startup of construction to daily vacuum all pavements affected by construction. The vacuum truck shall remain on-site for the duration of the project and shall be available at the discretion of the Authority to vacuum pavement areas adjacent to the construction areas to ensure no FOD is present on pavements within 500 feet of any construction area. Protecting the aircraft, airport tenants, users, public, etc. against FOD is a critical safety issue; therefore, the cost of the vacuum truck will be included in the cost established for this specification item.

7-10 Construction Control

A primary and alternate responsible Contractor's representative shall be designated by the Contractor. The Contractor's representatives shall be available locally on a 24-hour basis. Names of the primary and alternate, including phone number, shall be made available to the APM by the Contractor. The Contractor shall insure that the names and phone numbers are kept current and made available to the APM.

7-11 Construction Techniques

Construction shall be planned and conducted throughout this project in such a manner as to allow the maintenance of completely safe airport operations. Every effort shall be made to reduce the impact of construction activity on overall airport operations. To this end the Contractor's activities shall be conducted in such a manner to preclude, except where absolutely required, open excavations, trenches, ditches and above ground obstacles such as booms on cranes or obstacle markers such as wooden saw horses. The primary responsibility for assuring that the safest possible construction techniques are followed rests with the Contractor.

END OF SPECIAL PROVISIONS

EXHIBIT G

FEDERAL PROVISIONS

(attached)

FEDERAL PROVISIONS

(NON-AIP PROJECTS)

References in this Exhibit to “Sponsor” shall be deemed to refer to the Authority. Contractor shall: (i) insert these provisions in each lower tier contract; (ii) incorporate the requirements of these provisions by reference for work done under any purchase orders, rental agreements, and other agreements for supplies or services; and (iii) be responsible for compliance with these provisions by any subcontractor, lower-tier subcontractor, or service provider.

1. General Civil Rights Provisions

A. In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin, creed, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

B. This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

C. The above provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract.

2. Civil Rights – Title VI Assurance

A. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

1. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);

2. 49 CFR part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964) including amendments thereto;

3. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

4. Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 et seq.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);

5. The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 et seq.) (prohibits discrimination on the basis of age);

6. Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);

7. The Civil Rights Restoration Act of 1987 (P.L. 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

8. Titles II and III of the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;

9. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. § 1681, et seq).

B. During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “Contractor”), agrees as follows:

1. Compliance with Regulations: The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. Nondiscrimination: The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin, creed, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21 including amendments thereto.

3. Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor’s obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

4. Information and Reports: The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of a Contractor’s noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or

b. Cancelling, terminating, or suspending a contract, in whole or in part.

6. Incorporation of Provisions: The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

END OF FEDERAL PROVISIONS

EXHIBIT H

CLEAN CONSTRUCTION POLICY

(attached)

BUR CLEAN CONSTRUCTION POLICY

Consistent with the MOU between BUR and the South Coast Air Quality Management District, to reduce emissions of NO_x generated during the construction of capital improvement projects, Contractor is required to comply with the following requirements:

- On-road medium-duty and larger diesel-powered trucks with a gross vehicle weight rating of at least 14,001 pounds shall comply with USEPA 2010 on-road emissions standards for PM₁₀ and NO_x.
- All off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, USEPA Tier 4 (final) off-road emissions standards.
- The on-road haul truck and off-road construction equipment requirements shall apply unless Contractor provides documentation that one of the following circumstances exists, in which case the next cleanest vehicle or equipment available shall be used:
 - The Contractor does not have the required types of on-road haul trucks or off-road construction equipment within its current available inventory and intends to meet the requirements as to a particular vehicle or piece of equipment by leasing or short-term rental, and the Contractor has attempted in good faith and due diligence to lease the vehicle or equipment that would comply with these measures, but that vehicle or equipment is not available for lease or short-term rental within 120 miles of the project site, and the Contractor has submitted documentation to BUR showing that the requirements of this exception provision apply.
 - The Contractor has been awarded funding by SCAQMD or another agency that would provide some or all of the cost to retrofit, repower, or purchase a piece of equipment or vehicle, but the funding has not yet been provided due to circumstances beyond the Contractor's control, and the Contractor has attempted in good faith and due diligence to lease or short-term rent the equipment or vehicle that would comply with Policy, but that equipment or vehicle is not available for lease or short-term rental within 120 miles of the project site, and the Contractor has submitted documentation to BUR showing that the requirements of this exception provision apply.
 - Contractor has ordered a piece of equipment or vehicle to be used on the construction project in compliance with Policy at least 60 days before that equipment or vehicle is needed at the project site, but that equipment or vehicle has not yet arrived due to circumstances beyond the Contractor's control, and the Contractor has attempted in

good faith and due diligence to lease or short-term rent a piece of equipment or vehicle to meet the requirements of Policy, but that equipment or vehicle is not available for lease or short-term rental within 120 miles of the project, and the Contractor has submitted documentation to BUR showing that the requirements of this exception provision apply.
 - Construction-related diesel equipment or vehicles will be used on the project site for fewer than 20 calendar days per calendar year. The Contractor shall not consecutively use different equipment or vehicles that perform the same or a substantially similar function in an attempt to use this exception to circumvent the intent of the Policy.
 - Documentation of good faith efforts and due diligence regarding the above exceptions shall include written record(s) of inquiries (i.e., phone log[s]) to at least three (3) leasing/rental companies that provide construction-related on-road trucks of the type specified in the Policy above (i.e., medium-duty and larger diesel-powered trucks with a gross vehicle weight rating of at least 14,001 pounds) or diesel-powered off-road construction equipment such as the types to

be used by the Contractor, documenting the availability/unavailability of the required types of trucks/equipment. BUR will, from time-to-time, conduct independent research and verification of the availability of such vehicles and equipment for lease/rent within a 120-mile radius of BUR, which may be used in reviewing the acceptability of the Contractor's good faith efforts and due diligence.

- In any of the situations described above, the Contractor/ Subcontractor shall provide the next cleanest piece of equipment or vehicle as provided by the step-down schedules in Table A for Off-Road Equipment and Table B for On-Road Equipment.

Table A Off-Road Compliance Step Down Schedule*		
Compliance Alternative	Engine Standard	CARB-verified DECS (VDECS)
1	Tier 4 interim	N/A **
2	Tier 3	Level 3
3	Tier 2	Level 3
4	Tier 1	Level 3
5	Tier 2	Level 2
6	Tier 2	Level 1
7	Tier 3	Uncontrolled
8	Tier 2	Uncontrolled
9	Tier 1	Level 2
** Tier 4 (interim or final) or 2007 model year equipment not already supplied with a factory-equipped diesel particulate filter shall be outfitted with Level 3 VDECS.		
Equipment less than Tier 1, Level 2 shall not be permitted.		

Table B On-Road Compliance Step Down Schedule*		
Compliance Alternative	Engine Model Year	CARB-verified DECS (VDECS)
1	2007	N/A**
2	2004	Level 3
3	1998	Level 3
4	2004	Uncontrolled
5	1998	Uncontrolled
** 2007 Model Year equipment not already supplied with a factory-equipped diesel particulate filter shall be outfitted with Level 3 VDECS.		
Equipment with a model year earlier than Model Year 1998 shall not be permitted.		

- How to use Table A and Table B: For example, if Compliance Alternative #1 is required by this policy but Contractor cannot obtain an off-road vehicle that meets the Tier 4 interim standard (Compliance Alternative #1 in Table A) and meets one of the above exceptions, then Contractor shall use a vehicle that meets the next compliance alternative (Compliance Alternative #2) which is a Tier 3 engine standard equipped with a Level 3 VDECS. Should Contractor not be able to supply a vehicle with a Tier 3 engine equipped with a Level 3 VDECS in accordance with Compliance Alternative #2 and has satisfied the requirements of one of the above exceptions as to Contractor's ability to obtain a vehicle meeting Compliance Alternative #2, Contractor shall then supply a vehicle meeting the next compliance alternative (Compliance Alternative #3), and so on. If Contractor is proposing an exemption for on-road equipment, the step-down schedule in Table B should be used. The contractor must demonstrate that it has satisfied one of the exceptions listed above before it can use a subsequent Compliance Alternative. The goal of this requirement is to ensure that Contractor has exercised due diligence in supplying the cleanest fleet available.
- Nothing in the above shall require an emissions control device (i.e., VDECS) that does not meet OSHA standards.
- All diesel-fueled equipment will be outfitted with best available emissions control devices where technologically feasible; applies to off-road equipment (such as construction machinery), diesel-fueled on-road vehicles (such as trucks), and stationary diesel-fueled engines (such as electric generators).
- Contractors shall utilize grid-based electric power at the construction site where feasible. If diesel- or gasoline-fueled generators are necessary, generators using "clean burning diesel" fuel and exhaust mission controls shall be utilized.

Step 10 – CARB DOORS Number: This is an essential piece of information that must be included for each piece of off-road diesel equipment. The Air Resources Board DOORS number, also known as the **Equipment Identification Number** (EIN), is a unique designation assigned to off- road equipment under the In-Use Off-Road Diesel Vehicle Regulation. Vehicles included under the CARB regulation display a red sticker with a white alpha numeric unique to that vehicle.

Step 11 – Engine Tier Verified in DOORS Database: The Air Resources Board maintains a publicly-accessible database that allows vehicle and equipment information to be retrieved by referencing a DOORS number. For each vehicle included in the Reporting Form, the Diesel Off- Road Online Reporting System (DOORS) database should be checked to ensure the information reported by the company to BUR matches the data for that vehicle in the CARB database. This also allows the engine emissions certification TIER for that vehicle to be verified.

BUR requests that each vehicle or equipment reported that has a CARB assigned DOORS number (EIN number) be verified in the CARB Database which can be accessed using the following link:

https://www.arb.ca.gov/doors/public_info.html

Once this information has been verified, BUR requests that this be designated on the Reporting Form by inserting YES (Y) in column 11. Equipment that does not have a DOORS EIN should note that it cannot be accessed using the CARB database by inserting NO (N) in column 11.

Self-Certification

By allowing self-certification of compliance with the BUR Clean Construction policy, BUR reduces the administrative burden placed on companies working on CIP projects. BUR strongly encourages that companies exercise extreme diligence in completing the Clean Construction Policy Reporting Form accurately. BUR will monitor ongoing compliance through its construction management and conduct periodic audits of policy compliance.

EXHIBIT I

INSURANCE POLICY

(attached)

HOLLYWOOD BURBANK AIRPORT BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY INSURANCE REQUIREMENTS FOR AIRFIELD (MOVEMENT AREAS) CONTRACTED WORK

Contractor shall maintain the following insurance limits for the duration of a contracted project, and provide a certificate of insurance to the Authority as proof of such coverage as listed below:

1. **Comprehensive General Liability**

- \$10,000,000 single limit for combined Bodily Injury and Property Damage for each occurrence
- \$10,000,000 for Personal Injury for each occurrence
- Liability policies shall name the **Burbank-Glendale-Pasadena Airport Authority**, 2627 Hollywood Way, Burbank, CA 91505 as Certificate Holder and Additional Insured. Actual copies of endorsements must be attached to the certificate.

2. **Comprehensive Automobile Liability**

- \$10,000,000 single limit for combined Bodily Injury and Property Damage for each occurrence
- Liability policies shall name the **Burbank-Glendale-Pasadena Airport Authority**, 2627 Hollywood Way, Burbank, CA 91505 as Certificate Holder and an Additional Insured. Actual copies of endorsements must be attached to the certificate.

3. **Worker's Compensation**

- California statutory requirements including Employer's Liability insurance in the following amounts:

Bodily injury by accident - \$1,000,000 – each accident Bodily injury by disease - \$1,000,000 – policy limit
Bodily injury by disease - \$1,000,000 – each employee

4. **Effective Dates of Insurance Policies**

- All requisite insurance policies are required to be effective for a period of one year from the commencement of project.

NOTE: Certificates of Insurance on all policies shall be filed with the Procurement Department. Each of said insurance policies shall contain a provision requiring the insurer to notify the Burbank-Glendale-Pasadena Airport Authority ten (10) days prior to the cancellation or material change in the Policy.

PIDS Thermal Camera Upgrade

BURBANK-GLENDALE AIRPORT AUTHORITY

BOB HOPE AIRPORT
2627 HOLLYWOOD WAY
BURBANK, CA 91505

Number: Q-18070 Rev 2



Presented By:

Jared Leener

Director, Business Development

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Mobile Number: 818-274-6779



9001 Canoga Ave
Canoga Park, CA 91304



**BP9012
S8036**



Alarm Co #ACO1342 State Contractor #782737 UL License #58036

Mission

Our mission is to provide exceptional security solutions that meet our customers' unique needs and exceed their expectations for service, quality and value.

We earn customer loyalty through exceptional personalized service and integrity. We work hard to exceed expectations, deliver more than promised, and provide an extraordinary business experience by being honest and fair.

We are committed to offering growth and learning opportunities that enable our staff to provide value and exceptional service to our customers. Our success at satisfying customers and motivating employees enables us to achieve long-term growth and profitability.

About Us

Superior Alarms Systems, a Cobalt Service Partners company, is headquartered in Los Angeles. Established in 1981, Superior Alarm Systems (SAS) has grown significantly from a two-person operation to a team of more than 50 full-time staff members. Founder Doug Leener has established a company culture that fosters collaboration and empowers employees to grow and succeed.

Superior Alarm Systems is committed to delivering exceptional, personalized service to meet the unique security needs of every client. We partner with a diverse array of corporate clients, from large pharmaceuticals and manufacturing firms to entertainment studios and executive estates.

SAS is Underwriters Laboratories Listed and meets or exceeds nationally recognized standards for safety. The company provides systems for use in National Industrial Security applications and works closely with U.S. governmental agencies in this regard.

Superior Alarm Systems is highly regarded by the leading manufacturers of closed-circuit TV, access control, intrusion detection and fire alarm systems. As a true systems integration company, SAS provides total solutions in difficult environments.

Manufacturers have trusted the company to deploy cutting-edge technology, with SAS staff providing reliable insight into product performance and making informed recommendations for improved features. The management team at SAS has a proven track record in the security industry, with dozens of years of experience.

As the security industry transitions to integrated, IT-based solutions, Superior Alarm Systems proactively meets this evolution. Our seasoned professionals collaborate directly with corporate IT teams, ensuring the seamless planning and deployment of robust, enterprise-level security ecosystems that merge physical and cyber protection.

The company's sales and management departments continuously gain new certifications from leading manufacturers and industry organizations. SAS differentiates itself from generic security companies by investing heavily in employee training on the latest technologies and ensuring compliance with the codes of authorities having jurisdiction.



Bid

Number: Q-18070 Rev 2

Date: 4/28/2026

Project Summary

Taxable Equipment:	\$81,692.30
Non-Taxable Equipment:	\$1,750.00
Trip Charge:	\$315.00
Fuel Surcharge:	\$168.00
IT Labor:	\$11,895.00
Technician Labor:	\$19,140.00
Project Management Labor:	\$2,100.00
Sales Tax (10.5%):	\$8,577.69

Grand Total:	\$125,637.99

* Price Includes Accessories

Alarm Co #ACO1342 State Contractor #782737

9001 Canoga Ave, Canoga Park, CA 91304 (818) 700-7100 tel (818) 717-9700 fax

Page 15 of 19

Scope of Work

Install and provide:

- (16) Total Axis Cameras + various mounts
- (4) Hardened POE switches + SFP modules
- (2) Standard POE switches + SFP modules
- Misc. cat6 cables and wire supports

SAS to complete PIDS thermal camera upgrade project per scope of work. SAS has included new network switches (hardened/environmentally rated switches where required--- standard POE switches where being installed in a environmental enclosure). SAS has included all camera mounting accessories and analytics required for complete perimeter detection + PTZ auto-track capabilities. No new Genetec licenses nor archivers have been quoted, SAS will evaluate if additional Genetec licenses are needed before start of project and provide a separate quote as needed.

Exclusions:

1. Parking fees. If free parking is not provided by the client, additional charges will apply.
2. Relocation of furniture, room dividers, artwork, copiers, computer equipment, or other items deemed 'in the way' of the installation. Notification to the Owner or his agent as to the items in question will be made in advance. Failure to relocate/protect equipment may cause delays in completion of project.
3. Any Division 26 electrical work—including main supply circuits, branch circuits, circuit breakers, and transformers—shall be completed by others.
4. Any Division 23 HVAC or cooling system modifications required due to increased BTU load resulting from said installation shall be provided and installed by others.
5. Any painting and patch work, replacement of ceiling tiles or flooring.
6. Lift to be provided by BUR airport.

* Price Includes Accessories

Notes:

1. Quote is based upon standard working hours (Mon- Fri, 6:00am – 5:00pm).
 - a. If Premium working hours (Mon-Fri, 5:00pm – 6:00am; Saturday and Sunday) are required, additional fees will apply.
2. Any unforeseen obstructions within scope of job may incur additional charges.
3. ***SAS Pass Through* Pricing quoted DOES NOT INCLUDE the current estimated U.S. Section 301 tariff on the equipment. Tariff rates are subject to change without notice; any increase or decrease in force at the time purchase will be subject to additional costs and will be added to the final**
4. Engineering costs are not included (the design and engineering of all security plans and as-builts (Riser, floor, site plans, etc.)
5. *This proposal assumes that all conduit and cable infrastructure (connectors, fittings, junction boxes) is provided by SAS.*

PLEASE NOTE:

- *Axis Communications is having a price increase on 5/1 that could potentially effect this quote. Please send your approval to SAS prior to 5/13 (earlier is better) so that we can lock in the prices for Burbank Airport Authority.*
- *SAS to secure hardware, deliver to Burbank Airport Authority and complete installation by June 30, 2026.*

* Price Includes Accessories



Contract

- A. The general project description is contained in the attached document and related documents from herein referred to as the "Bid".
- B. The specific work to be performed by Contractor is the installation of the specified system as outlined in the scope of work.
- C. The total amount to be paid by the owner for the performance (subject to additions and deductions by written change order) shall not exceed the total specified in the Proposal.
- D. Progress payments will be made according to the payment schedule below. Equipment will not be ordered until the material acquisition has been submitted. These times are subject to the timing of the construction and the lead times required for the ordered equipment to be delivered.
- E. Payment is due immediately after invoicing. Unpaid balance beyond 30 days after invoicing of completed tasks as outlined in item D shall bear interest payable to Contractor at a rate of 1.5% per month simple interest.
- F. This Bid expires 30 days following the date stated on the top of this agreement. No work will be scheduled without a signed copy of this agreement. All drawings and specifications contingent on agreement and retainer.
- G. If job is of a retrofit/remodel nature on an existing structure, and scope of work exceeds time estimated to complete because of unforeseen circumstances, SAS will notify project contact and advise of additional charge prior to proceeding. If approved, owner shall be charged at Contractor's current posted rates for all extra labor involved in completing the job. A copy of Contractor's posted rates can be supplied on request from client.
- H. If Contractor engineering labor is included in the bid, work to be performed will be clearly noted and detailed in the bid "Scope of Work". If project engineering is requested after initial proposal has been approved, owner shall be charged at Contractor's current posted rates.
- I. Contractor reserves the right to replace proposed models in the case of obsolescence, discontinuation, or unavailability with a comparable model of equal or greater value upon customer approval. Contractor will not be held responsible or liable in any way for any said product's obsolescence, discontinuation, or unavailability.

Payment Schedule	Amount
Commencement of Work - Material Acquisition	\$50,255.20
Progress Payment #1 - Substantial Completion	\$62,819.00
Final Payment - Due on Client Handover	\$12,563.79

* Price Includes Accessories



1. Contract Documents and Details

The contract documents consist of this agreement, including all general provisions, special provisions, specifications, drawings, addenda, change orders, written interpretations, and written orders for minor changes in work. Work not covered by contract documents will not be required unless it is required by reasonable inference as being necessary to produce the intended result. The costs associated with any related work or materials, including, but not limited to electrical, drywall, painting, cabinets are not included unless specifically documented in the proposal. Contractor is not responsible for any underground trenching or laying or supplying of conduit for outside wiring.

2. Time

With respect to schedule completion of the tasks in section D, time is of the essence. If Contractor is delayed at any time in the progress of the work by owner change orders, fire, labor disputes, acts of God or other causes beyond Contractor's control, the completion schedule for the work or affected parts of the work shall be extended by the same amount of the time caused by the delay.

3. Payments and Completion

The above Payment Schedule is a guideline and approximation. Since contractor will, if possible, open, test and burn-in equipment before delivery, all components must be paid for before delivery to job site. Payments may not be withheld under any circumstances. Any disputes due to legal claims will be settled independently in good faith between the parties. Final payment shall be due immediately following completion of the project. Contractor will hold owner harmless with respect to claims of subcontractors and suppliers.

4. Insurance

Contractor shall purchase and maintain such insurance necessary to protect from claims under workers compensation and from any damage to the owner's property resulting from the conduct of this contract.

5. Changes in the Contract

The owner may order changes, additions, or modifications without invalidating the contract. Such changes must be in writing and signed by the owner. The contractor shall provide the owner in writing the amount of additional costs or cost reductions resulting from changes ordered within 15 working days unless this requirement is waived in writing by the owner. Change Orders shall be paid in full upon acceptance of change and shall not alter the contract's payment schedule. In case of product unavailability or discontinuation, contractor reserves the right to substitute equipment of equal or better quality with client approval. Contractor will be held blameless in case of product unavailability or discontinuation.

6. Warranty

Contractor warrants all Contractor furnished parts and labor involved in an installation, for one year. Contractor will also be glad to help the client get their manufacturer-warranted equipment serviced throughout the life of the said warranty, though additional SAS labor charges may apply.

Client:

Date

Contractor:

Superior Alarm Systems
ACO Lic#1342 ; C10 Lic# 782737

Date

* Price Includes Accessories