ATTACHMENT A - Technical Specifications Revisions
PART 1 – GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

The Work of this Contract consists of the complete construction of Taxiways, N, EE, widening of existing Taxiways P, R, N, and Y, relocation of the ARFF roadway, relocation of the AOA fence, the construction of a blast fence adjacent to the DART, and all associated airfield lighting upgrades and installation of the necessary storm system infrastructure to support the new pavement construction. Construction will be inside the Airport’s Air Operations Area (AOA). The Contractor shall be responsible for reviewing all existing conditions associated with the Work prior to commencement of work activities.

1.2 CONSTRUCTION PHASING

A. The contractor shall perform all work in accordance with Contract Documents and described herein. The Contractor shall perform the work of each phase within the periods of time and durations specified. Contractor shall provide all labor, material and equipment, including standby equipment necessary to guarantee construction and completion of the work within the constraints and timeframes specified for the individual phases and the overall project, and within the requirements of the Contract Documents. Liquidated damages in the amounts specified in the Contract Documents will be assessed if the Contractor fails to complete specific phases within the specified allowed durations.

B. Anticipated construction phase durations and sequencing are shown below. Milestone dates shall govern.

<table>
<thead>
<tr>
<th>CONSTRUCTION PHASE (BASE+ALT)</th>
<th>DURATION (Calendar Days)</th>
<th>ANTICIPATED/FIXED</th>
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<td>Phase 2 Taxiway N South of Taxiway Z, Taxiway N North of Taxiway Y.</td>
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<td>Phase 4 Taxiway N Within Taxiway Y Object Free Area</td>
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<tr>
<td>Phase 7 ARFF Road, Taxiway Y Widening and Taxiway N Widening</td>
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1. Liquidated Damages are associated with this phase as defined in Special Provisions 1.0
2. Phase occurs within another phase duration and should not contribute to the overall project duration.
### SUMMARY OF WORK
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<th>CONSTRUCTION PHASE (BASE)</th>
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1. Liquidated Damages are associated with this phase as defined in Special Provisions 1.0
2. Phase occurs within another phase duration and should not contribute to the overall project duration.

C. **Phase 1 (Base+Alt)**
   1. **Work Area M**
      a. Work Area M is bounded by the Taxiway Q TOFA on the northeast, Taxiway EJ TOFA on the south, and Taxiway P TOFA on the west.
      b. Restrictions and required closures: The ARFF road must always remain open.
      c. Work includes construction of proposed drainage just north of TW EJ.
   2. **Work Area AC**
      a. Work Area AC includes the Taxiway EJ TOFA and is bounded on the northeast by the Taxiway Q TOFA and as shown on the southwest.
      b. Restrictions and required closures: Work within Area AC requires closure of Taxiway EJ between Taxiway P and Taxiway Q. The ARFF road must always be kept open.
      c. Work includes proposed drainage.
   3. **Work Area AD**
      a. Work Area AD is bounded by the Taxiway EJ TOFA on the northwest, Taxiway Q TOFA on the southeast, and as shown.
      b. Restrictions and required closures: None.
c. Work includes construction of south outfall channel.

D. **Phase 2 (Base+Alt)**

1. **Work Area E**
   
a. Work Area E is bounded by the Taxiway Z TOFA on the north, Taxiway P TOFA on the east, Taxiway EJ TOFA on the south, and the Runway 17C-35C ROFA on the west.
   
b. Restrictions and required closures: None.
   
c. Work includes: Construction of proposed Taxiway N. Electrical signage, taxiway edge and center lights, and demolition of existing lights. Proposed grading and drainage. Pavement marking.

2. **Work Area I**
   
a. Work Area I is bounded by the edge of existing pavement on Taxiway S (future Taxiway N) on the north, Runway 17C-35C ROFA on the east, the Taxiway Z TOFA on the south, and the Runway 17C-35C RSA on the west.
   
b. Restrictions and required closures: No stockpiles or equipment may be left within the Runway 17C-35C ROFA.
   
c. Work includes: Proposed grading within 17C-35C ROFA, just west of future Taxiway N. Demolition of existing road.

3. **Work Area J**
   
a. Work Area J is bounded by the edge of existing pavement on Taxiway S (future Taxiway N) on the north, the Runway 13L-31R TOFA on the northeast, the Taxiway N (future Taxiway R) TOFA on the southeast, the Taxiway Y TOFA on the south, and the Runway 17C-35C ROFA on the west.
   
b. Restrictions and required closures: None.
   

4. **Work Area K**
   
a. Work Area K is within the Taxiway Y and Taxiway N TOFAs, bounded by the Taxiway N (future Taxiway R) TOFA on the northwest, the Taxiway R TOFA on the northeast, the Taxiway P TOFA on the southeast, Taxiway Z TOFA on the south, and the Runway 17C-35C ROFA on the west.
   
b. Restrictions and required closures: Work within Area K will require closure of Taxiway Y between Runway 17C-35C and Taxiway P, and closure of Taxiway N (future Taxiway R) between Taxiway R and Taxiway Z. Work in Area P must be completed prior to beginning work in Area K. Taxiway Y closure shall be no more than 90 days.
   
8.4. Work Area S
   a. Work Area S is bounded by the Taxiway EF TOFA on the north, Taxiway S TOFA on the east, Taxiway S edge of pavement, and the Runway 17C-35C ROFA on the west.
   b. Restrictions and required closures: Work may not occur within the glideslope critical area while Runway 17C is in use.

9.5. Work Area AG
   a. Work Area AG is within the Runway 17C-35C ROFA and is bounded on the north by the Taxiway Z TOFA, on the east by the Taxiway N TOFA, on the south by the Taxiway EJ TOFA, and on the west by the Runway 17C-35C RSA
   b. Restrictions and required closures: No stockpiles or equipment may be left within the Runway 17C-35C ROFA.
   c. Work includes proposed grading just north of area C.

E. Phase 3 (Base+Alt)
   1. Work Area F
      a. Work Area F is within the Taxiway Z TOFA, bounded by the Taxiway P TOFA on the east, and Runway 17C-35C ROFA on the west.
      b. Restrictions and required closures: Work within Area F will require closure of Taxiway Z between Runway 17C-35C and Taxiway P, and closure of Taxiway N between Taxiway Y and Taxiway Z. Taxiways Y and Z may not be closed at the same time. Taxiway Z may not be closed concurrently with Taxiway EJ. Taxiway Z closure shall be no more than 90 days.
   2. Work Area G
      a. Work Area G is within the Taxiway Z TOFA, bounded by the Runway 17C-35C ROFA on the east, and the Runway 17C-35C RSA on the west.
      b. Restrictions and required closures: Work within Area G will require closure of Taxiway Z between Runway 17C-35C and Taxiway N. Taxiways Y and Z may not be closed at the same time. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Taxiway Z may not be closed concurrently with Taxiway EJ. Taxiway Z closure shall be no more than 90 days.
3. Work Area L
   a. Work Area L is within the Taxiway P and Taxiway Z TOFAs and is bounded by the Taxiway Y TOFA on the north and as shown on the south.
   b. Require closure of Taxiway P between Taxiway EJ and Taxiway Y, and Taxiway Z between Taxiway Q and Taxiway N. Taxiways Y and Z may not be closed at the same time. Taxiway Z may not be closed concurrently with Taxiway EJ. Taxiway Z closure shall be no more than 90 days.

4. Work Area Y
   a. Work Area Y includes the Runway 17C-35C RSA.
   b. Restrictions and required closures: Work within Area Y requires closure of Runway 17C-35C.
   c. Work includes: Placement of electrical signage and demo of circuitry within 17C-35C RSA. Pavement marking on Taxiway N1 within RSA.

5. Work Area AH
   a. Work Area AH is within the Taxiway Z TOFA and is bounded on the east by the Runway 17C-35C RSA and on the west by the Runway 17R-35L ROFA.
   b. Restrictions and required closures: Work in Area AH requires closure of Taxiway Z between Runway 17C-35C and Runway 17R-35L and closure of Taxiway M between Taxiway EJ and Taxiway Y. Taxiway Z may not be closed at the same time as Taxiway Y. No stockpiles or equipment may be left within the Runway 17C-35C ROFA.
   c. Work includes: Pavement marking at intersection of Taxiway M and Taxiway Z.

F. Phase 4 (Base+Alt)
1. Work Area H
   a. Work Area H is within the Taxiway Y TOFA, bounded by the Runway 17C-35C ROFA on the east, and the Runway 17C-35C RSA on the west.
   b. Restrictions and required closures: Work within Area H will require closure of Taxiway Y between Runway 17C-35C and Taxiway N. Taxiways Y and Z may not be closed at the same time. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Taxiway Y may not be closed concurrently with Taxiway EJ. Taxiway Y closure shall be no more than 90 days.
2. Work Area K
   a. Work Area K is within the Taxiway Y and Taxiway N TOFAs, bounded by the Taxiway N (future Taxiway R) TOFA on the northwest, the Taxiway R TOFA on the northeast, the Taxiway P TOFA on the southeast, Taxiway Z TOFA on the south, and the Runway 17C-35C ROFA on the west.
   b. Restrictions and required closures: Work within Area K will require closure of Taxiway Y between Runway 17C-35C and Taxiway P, and closure of Taxiway N (future Taxiway R) between Taxiway R and Taxiway Z. Work in Area P must be completed prior to beginning work in Area K. Taxiway Y closure shall be no more than 90 days.

3. Work Area Y
   a. Work Area Y includes the Runway 17C-35C RSA.
   b. Restrictions and required closures: Work within Area Y requires closure of Runway 17C-35C.
   c. Work includes: Placement of electrical signage and demo of circuitry within 17C-35C RSA. Pavement marking on Taxiway N1 within RSA.

4. Work Area AI
   a. Work Area AI is within the Taxiway Y TOFA and is bounded on the east by the Runway 17C-35C RSA and on the west by the Runway 17R-35L ROFA.
   b. Restrictions and required closures: Work in Area AI requires closure of Taxiway Y between Runway 17C-35C and Runway 17R-35L and closure of Taxiway M between Taxiway Z and Taxiway EG. Taxiway Y may not be closed at the same time as Taxiway Z. No stockpiles or equipment may be left within the Runway 17C-35C ROFA.
   c. Work includes: Pavement marking at intersection of Taxiway Y and Taxiway M.

G. Phase 5 (Base+Alt)
   1. Work Area A
      a. Work Area A is bounded by the Taxiway EJ Taxiway Object Free Area (TOFA) on the north, Taxiway P TOFA on the east, the Aircraft Rescue and Fire Fighting (ARFF) road on the south, and the Runway 17C-35C ROFA on the west.
      b. Restrictions and required closures: No restriction, except that Work Area A will be unavailable after Taxiway N1 is opened for use.
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2. Work Area B
   a. Work Area B is bounded by the Taxiway EJ Taxiway Object Free Area (TOFA) on the north, Runway 17C-35C ROFA on the east, the ARFF road on the south, and the Runway 17C-35C RSA on the west.
   b. Restrictions and required closures: No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Work Area B will be unavailable after Taxiway N1 is opened for use.

3. Work Area C
   a. Work Area C is within the Taxiway EJ Taxiway Object Free Area (TOFA), bounded by the Runway 17C-35C ROFA on the east, and the Runway 17C-35C RSA on the west.
   b. Restrictions and required closures: Work within Area C will require closure of Taxiway EJ. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Taxiway EJ may not be closed concurrently with either Taxiways Y or Z.

4. Work Area D
   a. Work Area D is within the Taxiway EJ TOFA, bounded by the Taxiway P TOFA on the east, and Runway 17C-35C ROFA on the west.
   b. Restrictions and required closures: Work within Area D will require closure of Taxiway EJ and will be unavailable after Taxiway N1 is opened for use. Taxiway EJ may not be closed concurrently with either Taxiways Y or Z.
   c. Work includes: Installation of new taxiway edge lights, center lights, and electrical signage at intersection of Taxiway N and EJ. Demolition of existing lights. Pavement marking.

H. Phase 6 (Base+Alt)
   1. Work Area T-1
      a. Work Area T-1 is bounded includes areas within the Taxiway EF, by Taxiway S (future Taxiway N) TODA on the north and west and as sown on the south and east, and North Air Freight Ramp connector TOFAs. It is partially bounded by the Runway 17C-35C ROFA on the west.
      b. Restrictions and required closures: Work within Area T-1 requires the closure of Taxiway EF, Taxiway S (future Taxiway N), and the North Air Freight Ramp connector. The new ARFF road construction must be completed prior to demolition of the existing ARFF road. Work in Area V must be completed prior to beginning work in Area T-1. Restrictions and required closures: Work may not occur within the glideslope critical area while Runway 17C is in use.
      c. Work includes: Construction of proposed ARFF just south of East Pump Station. Work in area T-1 shall be completed in 21 calendar days.
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Placement of electrical signage and taxiway centerline lights. Proposed grading. Demolition of existing ARFF road once portion of proposed has been constructed. Pavement marking.

2. Work Area T
   a. Work Area T includes Area T-1 and T-2. It is bounded partially by the 17C-35C RSA and as shown
   b. Restrictions and required closures: Work within Area T requires the closure of Taxiway EF, Taxiway S (future Taxiway N), and the North Air Freight Ramp connector. The new ARFF road construction must be completed prior to demolition of the existing ARFF road. Work in Area V must be completed prior to beginning work in Area T-2. Restrictions and required closures: Work may not occur within the glideslope critical area while Runway 17C is in use.
   c. Work includes: Demolition of existing ARFF road, proposed grading, proposed drainage, placement of electrical, signage and taxiway centerline lights, and pavement marking.

2-3. Work Area U
   a. Work Area U is within the Taxiway EJ TOFA and is bounded on the east by the Runway 17C-35C ROFA, and on the west by the Runway 17C-35C RSA.
   b. Restrictions and required closures: Work within Area U requires the closure of Taxiway EJ. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Area U is also within the Runway 17C POFZ, and work may not occur when Runway 17C is in use.
   c. Work includes: Placement of electrical signage on Taxiway EF within ROFA.

3-4. Work Area V
   a. Work Area V is bounded by the North Air Freight Ramp connector TOFA on the south and as shown.
   b. Restrictions and required closures: Construction of the new ARFF road and connecting portion of Taxiway S (future Taxiway N) must be completed prior to demolition of the existing ARFF road in Work Area T. Work in Area V must be completed prior to beginning work in Area T.

4-5. Work Area W
   a. Work Area W is bounded as shown on the phasing plans.
   b. Restrictions and required closures: None
marking. Contractor will be required to include an access road from Gate 210 to the NE EAT Package III work area. Access will be required at all times.

5.6. Work Area X
   a. Work Area X is bounded by the Taxiway M and Taxiway EE TOFAs.
   b. Restrictions and required closures: Work within Area X requires closure of Taxiway M between Taxiway EF and Taxiway EE, closure of Taxiway K between Taxiway EF and Taxiway M, and Taxiway EE between Taxiway K and Taxiway M.
   c. Work includes: Placement of taxiway edge and center lights at intersection of Taxiway M and future Taxiway N. Pavement marking

7. Work Area Q
   a. Work Area Q is bounded by the Runway 13L-31R ROFA on the northeast, the Runway 13L-31R RSA on the southwest, and as shown on the northwest and southeast.
   b. Restrictions and required closures: Work within Area Q will require the closure of a portion of the ARFF road southeast of Taxiway P. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. The ARFF road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.

8. Work Area R
   a. Work Area R is bounded by the edge of the ARFF road to the northeast, by the Runway 13L-31R ROFA on the southwest, and as shown on the northwest and southeast.
   b. Restrictions and required closures: Work within Area R will require the closure of a portion of the ARFF road southeast of Taxiway P. The ARFF road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.

I. Phase 7 (Base+Alt)
   1. Work Area J
      a. Work Area J is bounded by the edge of existing pavement on Taxiway S (future Taxiway N) on the north, the Runway 13L-31R TOFA on the northeast, the Taxiway N (future Taxiway R) TOFA on the southeast, the Taxiway Y TOFA on the south, and the Runway 17C-35C ROFA on the west.
      b. Restrictions and required closures: None.

2. Work Area N

a. Work Area N is within the Taxiway R and Taxiway N TOFAs and is bounded by the Taxiway N TOFA on the northwest, the Runway 13L-31R ROFA on the northeast, the Taxiway P TOFA on the southeast, and the Taxiway R TOFA on the southwest.

b. Restrictions and required closures: Work within Area N will require closure of Taxiway R between Taxiway P and Taxiway N, and Taxiway N (future Taxiway R) between Runway 13L-31R and Taxiway R. Taxiway N (future Taxiway R) and Taxiway P may not be closed at the same time.


3. Work Area O

a. Work Area O is within the Taxiway N TOFA and is bounded by the Runway 13L-31R RSA on the northeast and the Runway 13L-31R ROFA on the southwest.

b. Restrictions and required closures: Work within Area O will require closure of Taxiway N (future Taxiway R) between Runway 13L-31R and Taxiway R. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. Taxiway N (future Taxiway R) and Taxiway P may not be closed at the same time.


4. Work Area P

a. Work Area P is within the Taxiway R, R1, and P TOFAs, and is bounded by the Taxiway P TOFA on the northwest, and as shown on the southeast.

b. Restrictions and required closures: Work within Area P will require closure of Taxiway R between Taxiway R1 and Taxiway N and Taxiway P between Runway 13L-31R and Taxiway N. Work in Area P must be completed prior to beginning work in Area K. Work within Area P must be completed prior to beginning work in Area AE.


5. Work Area Z

a. Work Area Z includes the Runway 13L-31R RSA.
b. Restrictions and required closures: Work within Area Z requires closure of Runway 13L-31R.
c. Work includes: Placement of electrical signage within 13L-31R RSA. Pavement marking for existing Taxiway N and Taxiway P within RSA.

6. Work Area AA
   a. Work Area AA is within the Taxiway N (future Taxiway R) TOFA and is bounded by the East Air Freight Ramp on the northeast, and the Runway 13L-31R ROFA on the southwest.
   b. Restrictions and required closures: Work in Area AA requires closure of Taxiway N (future Taxiway R) between the East Air Freight Ramp and Runway 13L-31R. Taxiway N (future Taxiway R) may not be closed at the same time as Taxiway P.
   c. Work includes: Placement of electrical signage near East Air Freight Ramp.

7. Work Area AB
   a. Work Area AB is within the Taxiway N (future Taxiway R) TOFA and is bounded by the Runway 13L-31R ROFA on the northeast and the Runway 13L-31R RSA on the southwest.
   b. Restrictions and required closures: Work in Area AB requires closure of Taxiway N (future Taxiway R) between the East Air Freight Ramp and Runway 13L-31R. Taxiway N (future Taxiway R) may not be closed at the same time as Taxiway P. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. The ARFF road must always remain open.
   c. Work includes: Placement of electrical signage near Runway 13L ARFF road within Runway 13L-31 R ROFA.

8. Work Area AE
   a. Work Area AE includes portions of the Taxiway Q and Taxiway R1 TOFAs and is bounded on the northeast by the Taxiway R1 TOFA and as shown on the south.
   b. Restrictions and required closures: Work within Area AE requires closure of Taxiway Q between Taxiway EJ and Taxiway R1, and closure of Taxiway R1 between Taxiway R and Taxiway P. Taxiway R1 cannot be closed simultaneously with Taxiway P. Work within Area P must be completed prior to beginning work in Area AE. Taxiway R1 shall remain open to traffic until Taxiway R and Y construction is complete and open to traffic.
   c. Work includes: Pavement marking. Placement and demo of taxiway edge lights and electrical signage. Proposed grading and drainage on Taxiway Q.

9. Work Area AF
   a. Work Area AF is bounded by the Taxiway N (future Taxiway R) TOFA on the northwest, the Runway 13L-31R ROFA on the northeast, as shown on the southeast, the Taxiway R TOFA on the southwest.
   b. Restrictions and required closures: Work in Area AF requires closure of Taxiway P. Taxiway P may not be closed at the same time as Taxiway N
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(future Taxiway R). No stockpiles or equipment may be left within the Runway 13L-31R ROFA. Area AF is also within the Runway 13L POFZ, and work may not occur when Runway 13L is in use.

c. Work includes: Proposed drainage within Runway 13L-13R RSA.

10. Work Area AJ
   a. Work Area AJ is within the Taxiway R and R1 TOFAs and is bounded on the northeast by the Runway 13L-31R ROFA, as shown on the south, and by the Taxiway Q TOFA on the southwest. Restrictions and required closures: None.
   b. Restrictions and required closures: Work in Area AJ requires closure of Taxiway R between Taxiway EJ and Taxiway P, and closure of Taxiway R1 between Runway 13L-31R and Taxiway Q. ARFF road access must always be maintained. Taxiway R1 shall remain open to traffic until Taxiway R and Y construction is complete and open to traffic.
   c. Work includes: Construction of proposed geometry near intersection of Taxiway R1 and Taxiway Q. Placement of taxiway center and edge lights and demo of existing. Proposed grading. Pavement marking.

J. Phase 8 (Base+Alt)

1. Work Area Q
   a. Work Area Q is bounded by the Runway 13L-31R ROFA on the northeast, the Runway 13L-31R RSA on the southwest, and as shown on the northwest and southeast.
   b. Restrictions and required closures: Work within Area Q will require the closure of a portion of the ARFF road southeast of Taxiway P. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. The ARFF road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.

2. Work Area R
   a. Work Area R is bounded by the edge of the ARFF road to the northeast, by the Runway 13L-31R ROFA on the southwest, and as shown on the northwest and southeast.
   b. Restrictions and required closures: Work within Area R will require the closure of a portion of the ARFF road southeast of Taxiway P. The ARFF road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.

K.J. Phase 1 (Base)

1. Work Area M
   a. Work Area M is bounded by the Taxiway Q TOFA on the northeast, Taxiway EJ TOFA on the south, and Taxiway P TOFA on the west.
b. Restrictions and required closures: The ARFF road must always remain open.

c. Work includes construction of proposed drainage just north of TW EJ.

2. Work Area AC

a. Work Area AC includes the Taxiway EJ TOFA and is bounded on the northeast by the Taxiway Q TOFA and as shown on the southwest.

b. Restrictions and required closures: Work within Area AC requires closure of Taxiway EJ between Taxiway P and Taxiway Q. The ARFF road must always be kept open.

c. Work includes proposed drainage.

3. Work Area AD

a. Work Area AD is bounded by the Taxiway EJ TOFA on the northwest, Taxiway Q TOFA on the southeast, and as shown.

b. Restrictions and required closures: None.

c. Work includes construction of south outfall channel.

**L.K. Phase 2 (Base)**

1. Work Area E

a. Work Area E is bounded by the Taxiway Z TOFA on the north, Taxiway P TOFA on the east, Taxiway EJ TOFA on the south, and the Runway 17C-35C ROFA on the west.

b. Restrictions and required closures: None.

c. Work includes: Construction of proposed Taxiway N. Electrical signage, taxiway edge and center lights, and demolition of existing lights. Proposed grading and drainage. Pavement marking.

2. Work Area I

a. Work Area I is bounded by the edge of existing pavement on Taxiway S (future Taxiway N) on the north, Runway 17C-35C ROFA on the east, the Taxiway Z TOFA on the south, and the Runway 17C-35C RSA on the west.

b. Restrictions and required closures: No stockpiles or equipment may be left within the Runway 17C-35C ROFA.

c. Work includes: Proposed grading within 17C-35C ROFA, just west of future Taxiway N. Demolition of existing road.

3. Work Area J

a. Work Area J is bounded by the edge of existing pavement on Taxiway S (future Taxiway N) on the north, the Runway 13L-31R TOFA on the northeast, the Taxiway N (future Taxiway R) TOFA on the southeast, the Taxiway Y TOFA on the south, and the Runway 17C-35C ROFA on the west.

b. Restrictions and required closures: None.
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4. Work Area K
   a. Work Area K is within the Taxiway Y and Taxiway N TOFAs, bounded by
      the Taxiway N (future Taxiway R) TOFA on the northwest, the Taxiway R
      TOFA on the northeast, the Taxiway P TOFA on the southeast, Taxiway Z
      TOFA on the south, and the Runway 17C-35C ROFA on the west.
   b. Restrictions and required closures: Work within Area K will require closure
      of Taxiway Y between Runway 17C-35C and Taxiway P, and closure of
      Taxiway N (future Taxiway R) between Taxiway R and Taxiway Z. Work in
      Area P must be completed prior to beginning work in Area K. Taxiway Y
      closure shall be no more than 100 days.
   c. Work includes: Proposed construction at intersection of Future Taxiway N
      and Taxiway Y. Placement of taxiway edge and center lights and demo of
      existing. Placement of electrical signage and demolition of existing.
      Proposed grading and drainage. Pavement marking. Demolition of existing
      Taxiway N. Asbestos abatement.

5. Work Area S
   a. Work Area S is bounded by the Taxiway EF TOFA on the north, Taxiway
      S TOFA on the east, Taxiway S edge of pavement, and the Runway 17C-
      35C ROFA on the west.
   b. Restrictions and required closures: Work may not occur within the
      glideslope critical area while Runway 17C is in use.
   c. Work includes: Placement of taxiway edge and center lights on existing

6. Work Area AG
   a. Work Area AG is within the Runway 17C-35C ROFA and is bounded on
      the north by the Taxiway Z TOFA, on the east by the Taxiway N TOFA, on
      the south by the Taxiway EJ TOFA, and on the west by the Runway 17C-
      35C RSA
   b. Restrictions and required closures: No stockpiles or equipment may be left
      within the Runway 17C-35C ROFA.
   c. Work includes proposed grading just north of area C.

M-L. Phase 3 (Base)
   1. Work Area F
      a. Work Area F is within the Taxiway Z TOFA, bounded by the Taxiway P
         TOFA on the east, and Runway 17C-35C ROFA on the west.
      b. Restrictions and required closures: Work within Area F will require closure
         of Taxiway Z between Runway 17C-35C and Taxiway P, and closure of
         Taxiway N between Taxiway Y and Taxiway Z. Taxiways Y and Z may not
         be closed at the same time. Taxiway Z may not be closed concurrently with
         Taxiway EJ. Taxiway Z closure shall be no more than 90 days.
SUMMARY OF WORK
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1. Work Area A


2. Work Area G

a. Work Area G is within the Taxiway Z TOFA, bounded by the Runway 17C-35C ROFA on the east, and the Runway 17C-35C RSA on the west.

b. Restrictions and required closures: Work within Area G will require closure of Taxiway Z between Runway 17C-35C and Taxiway N. Taxiways Y and Z may not be closed at the same time. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Taxiway Z may not be closed concurrently with Taxiway EJ. Taxiway Z closure shall be no more than 90 days.


3. Work Area L

a. Work Area L is within the Taxiway P and Taxiway Z TOFAs and is bounded by the Taxiway Y TOFA on the north and as shown on the south.

b. Require closure of Taxiway P between Taxiway EJ and Taxiway Y, and Taxiway Z between Taxiway Q and Taxiway N. Taxiways Y and Z may not be closed at the same time. Taxiway Z may not be closed concurrently with Taxiway EJ. Taxiway Z closure shall be no more than 90 days.


4. Work Area Y

a. Work Area Y includes the Runway 17C-35C RSA.

b. Restrictions and required closures: Work within Area Y requires closure of Runway 17C-35C.

c. Work includes: Placement of electrical signage and demo of circuitry within 17C-35C RSA. Pavement marking on Taxiway N1 within RSA.

5. Work Area AH

a. Work Area AH is within the Taxiway Z TOFA and is bounded on the east by the Runway 17C-35C RSA and on the west by the Runway 17R-35L ROFA.

b. Restrictions and required closures: Work in Area AH requires closure of Taxiway Z between Runway 17C-35C and Runway 17R-35L and closure of Taxiway M between Taxiway EJ and Taxiway Y. Taxiway Z may not be closed at the same time as Taxiway Y. No stockpiles or equipment may be left within the Runway 17C-35C ROFA.
c. Work includes: Pavement marking at intersection of Taxiway M and Taxiway Z.

**N.M. Phase 4 (Base)**

1. Work Area H
   a. Work Area H is within the Taxiway Y TOFA, bounded by the Runway 17C-35C ROFA on the east, and the Runway 17C-35C RSA on the west.
   b. Restrictions and required closures: Work within Area H will require closure of Taxiway Y between Runway 17C-35C and Taxiway N. Taxiways Y and Z may not be closed at the same time. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Taxiway Y may not be closed concurrently with Taxiway EJ. Taxiway Y closure shall be no more than 100 days.

2. Work Area K
   a. Work Area K is within the Taxiway Y and Taxiway N TOFAs, bounded by the Taxiway N (future Taxiway R) TOFA on the northwest, the Taxiway R TOFA on the northeast, the Taxiway P TOFA on the southeast, Taxiway Z TOFA on the south, and the Runway 17C-35C ROFA on the west.
   b. Restrictions and required closures: Work within Area K will require closure of Taxiway Y between Runway 17C-35C and Taxiway P, and closure of Taxiway N (future Taxiway R) between Taxiway R and Taxiway Z. Work in Area P must be completed prior to beginning work in Area K. Taxiway Y closure shall be no more than 100 days.

3. Work Area Y
   a. Work Area Y includes the Runway 17C-35C RSA.
   b. Restrictions and required closures: Work within Area Y requires closure of Runway 17C-35C.
   c. Work includes: Placement of electrical signage and demo of circuitry within 17C-35C RSA. Pavement marking on Taxiway N1 within RSA.

4. Work Area Al
   a. Work Area Al is within the Taxiway Y TOFA and is bounded on the east by the Runway 17C-35C RSA and on the west by the Runway 17R-35L ROFA.
   b. Restrictions and required closures: Work in Area Al requires closure of Taxiway Y between Runway 17C-35C and Runway 17R-35L and closure
of Taxiway M between Taxiway Z and Taxiway EG. Taxiway Y may not be closed at the same time as Taxiway Z. No stockpiles or equipment may be left within the Runway 17C-35C ROFA.

c. Work includes: Pavement marking at intersection of Taxiway Y and Taxiway M.

O.N. Phase 5 (Base)

1. Work Area A
   a. Work Area A is bounded by the Taxiway EJ Taxiway Object Free Area (TOFA) on the north, Taxiway P TOFA on the east, the Aircraft Rescue and Fire Fighting (ARFF) road on the south, and the Runway 17C-35C ROFA on the west.
   b. Restrictions and required closures: No restriction, except that Work Area A will be unavailable after Taxiway N1 is opened for use.

2. Work Area B
   a. Work Area B is bounded by the Taxiway EJ Taxiway Object Free Area (TOFA) on the north, Runway 17C-35C ROFA on the east, the ARFF road on the south, and the Runway 17C-35C RSA on the west.
   b. Restrictions and required closures: No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Work Area B will be unavailable after Taxiway N1 is opened for use.

3. Work Area C
   a. Work Area C is within the Taxiway EJ Taxiway Object Free Area (TOFA), bounded by the Runway 17C-35C ROFA on the east, and the Runway 17C-35C RSA on the west.
   b. Restrictions and required closures: Work within Area C will require closure of Taxiway EJ. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Taxiway EJ may not be closed concurrently with either Taxiways Y or Z.

4. Work Area D
   a. Work Area D is within the Taxiway EJ TOFA, bounded by the Taxiway P TOFA on the east, and Runway 17C-35C ROFA on the west.
   b. Restrictions and required closures: Work within Area D will require closure of Taxiway EJ and will be unavailable after Taxiway N1 is opened for use. Taxiway EJ may not be closed concurrently with either Taxiways Y or Z.
c. Work includes: Installation of new taxiway edge lights, center lights, and electrical signage at intersection of Taxiway N and EJ. Demolition of existing lights. Pavement marking.

**P.O. Phase 6 (Base)**

1. **Work Area T-1**
   
a. **Work** Area T-1 is bounded by Taxiway S (future Taxiway N) TODA on the north and west and as shown on the south and east.
   
b. Restrictions and required closures: Work within Area T-1 requires the closure of Taxiway EF, Taxiway S (future Taxiway N), and the North Air Freight Ramp connector. The new ARFF road construction must be completed prior to demolition of the existing ARFF road. Work in Area V must be completed prior to beginning work in Area T-1.
   
c. **Work** includes: Construction of proposed ARFF just south of East Pump Station. Work in area T-1 shall be completed in 21 calendar days.

2. **Work Area T**
   
a. **Work** Area T includes Area T-1 and T-2. It is bounded partially by the 17C-35C RSA and as shown.
   
b. Restrictions and required closures: Work within Area T requires the closure of Taxiway EF, Taxiway S (future Taxiway N), and the North Air Freight Ramp connector. The new ARFF road construction must be completed prior to demolition of the existing ARFF road. Work in Area V must be completed prior to beginning work in Area T-2. Restrictions and required closures: Work may not occur within the glideslope critical area while Runway 17C is in use.
   
c. **Work** includes: Demolition of existing ARFF road, proposed grading, proposed drainage, placement of electrical, signage and taxiway centerline lights, and pavement marking.

1. **Work Area T**
   
a. **Work** Area T includes areas within the Taxiway EF, Taxiway S (future Taxiway N), and North Air Freight Ramp connector TOFAs. It is partially bounded by the Runway 17C-35C ROFA on the west.
   
b. Restrictions and required closures: Work within Area T requires the closure of Taxiway EF, Taxiway S (future Taxiway N), and the North Air Freight Ramp connector. The new ARFF road construction must be completed prior to demolition of the existing ARFF road. Work in Area V must be completed prior to beginning work in Area T. Restrictions and required closures: Work may not occur within the glideslope critical area while Runway 17C is in use.
   
c. **Work** includes: Construction of proposed ARFF just south of East Pump Station. Placement of electrical signage and taxiway centerline lights. Proposed grading. Demolition of existing ARFF road once portion of proposed has been constructed. Pavement marking.

2-3. **Work Area U**
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a. Work Area U is within the Taxiway EJ TOFA and is bounded on the east by the Runway 17C-35C ROFA, and on the west by the Runway 17C-35C RSA.

b. Restrictions and required closures: Work within Area U requires the closure of Taxiway EJ. No stockpiles or equipment may be left within the Runway 17C-35C ROFA. Area U is also within the Runway 17C POFZ, and work may not occur when Runway 17C is in use.

c. Work includes: Placement of electrical signage on Taxiway EF within ROFA.

3-4. Work Area V

a. Work Area V is bounded by the North Air Freight Ramp connector TOFA on the south and as shown.

b. Restrictions and required closures: Construction of the new ARFF road and connecting portion of Taxiway S (future Taxiway N) must be completed prior to demolition of the existing ARFF road in Work Area T. Work in Area V must be completed prior to beginning work in Area T.


4-5. Work Area W

a. Work Area W is bounded as shown on the phasing plans.

b. Restrictions and required closures: None

c. Work includes: Construction of future Taxiway N. Placement of taxiway edge/center lights and electrical signage. Proposed drainage and grading. Construction of northeast outfall channel. Proposed fencing. Pavement marking. Contractor will be required to include an access road from Gate 210 to the NE EAT Package III work area. Access will be required at all times.

5-6. Work Area X

a. Work Area X is bounded by the Taxiway M and Taxiway EE TOFAs.

b. Restrictions and required closures: Work within Area X requires closure of Taxiway M between Taxiway EF and Taxiway EE, closure of Taxiway K between Taxiway EF and Taxiway M, and Taxiway EE between Taxiway K and Taxiway M.

c. Work includes: Placement of taxiway edge and center lights at intersection of Taxiway M and future Taxiway N. Pavement marking

7. Work Area Q

a. Work Area Q is bounded by the Runway 13L-31R ROFA on the northeast, the Runway 13L-31R RSA on the southwest, and as shown on the northwest and southeast.

b. Restrictions and required closures: Work within Area Q will require the closure of a portion of the ARFF road southeast of Taxiway P. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. The ARFF
road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.


8. Work Area R

a. Work Area R is bounded by the edge of the ARFF road to the northeast, by the Runway 13L-31R ROFA on the southwest, and as shown on the northwest and southeast.

b. Restrictions and required closures: Work within Area R will require the closure of a portion of the ARFF road southeast of Taxiway P. The ARFF road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.


Q.P. Phase 7 (Base)

1. Work Area J

a. Work Area J is bounded by the edge of existing pavement on Taxiway S (future Taxiway N) on the north, the Runway 13L-31R TOFA on the northeast, the Taxiway N (future Taxiway R) TOFA on the southeast, the Taxiway Y TOFA on the south, and the Runway 17C-35C ROFA on the west.

b. Restrictions and required closures: None.


2. Work Area N

a. Work Area N is within the Taxiway R and Taxiway N TOFAs and is bounded by the Taxiway N TOFA on the northwest, the Runway 13L-31R ROFA on the northeast, the Taxiway P TOFA on the southeast, and the Taxiway R TOFA on the southwest.

b. Restrictions and required closures: Work within Area N will require closure of Taxiway R between Taxiway P and Taxiway N, and Taxiway N (future Taxiway R) between Runway 13L-31R and Taxiway R. Taxiway N (future Taxiway R) and Taxiway P may not be closed at the same time.


3. Work Area O

a. Work Area O is within the Taxiway N TOFA and is bounded by the Runway 13L-31R RSA on the northeast and the Runway 13L-31R ROFA on the southwest.
Restrictions and required closures: Work within Area O will require closure of Taxiway N (future Taxiway R) between Runway 13L-31R and Taxiway R. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. Taxiway N (future Taxiway R) and Taxiway P may not be closed at the same time.


4. Work Area P
   a. Work Area P is within the Taxiway R, R1, and P TOFAs, and is bounded by the Taxiway P TOFA on the northwest, and as shown on the southeast.
   b. Restrictions and required closures: Work within Area P will require closure of Taxiway R between Taxiway R1 and Taxiway N and Taxiway P between Runway 13L-31R and Taxiway N. Work in Area P must be completed prior to beginning work in Area K. Work within Area P must be completed prior to beginning work in Area AE.

5. Work Area Z
   a. Work Area Z includes the Runway 13L-31R RSA.
   b. Restrictions and required closures: Work within Area Z requires closure of Runway 13L-31R.
   c. Work includes: Placement of electrical signage within 13L-31R RSA. Pavement marking for existing Taxiway N and Taxiway P within RSA.

6. Work Area AA
   a. Work Area AA is within the Taxiway N (future Taxiway R) TOFA and is bounded by the East Air Freight Ramp on the northeast, and the Runway 13L-31R ROFA on the southwest.
   b. Restrictions and required closures: Work in Area AA requires closure of Taxiway N (future Taxiway R) between the East Air Freight Ramp and Runway 13L-31R. Taxiway N (future Taxiway R) may not be closed at the same time as Taxiway P.
   c. Work includes: Placement of electrical signage near East Air Freight Ramp.

7. Work Area AB
   a. Work Area AB is within the Taxiway N (future Taxiway R) TOFA and is bounded by the Runway 13L-31R ROFA on the northeast and the Runway 13L-31R RSA on the southwest.
   b. Restrictions and required closures: Work in Area AB requires closure of Taxiway N (future Taxiway R) between the East Air Freight Ramp and Runway 13L-31R. Taxiway N (future Taxiway R) may not be closed at the same time as Taxiway P. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. The ARFF road must always remain open.
c. Work includes: Placement of electrical signage near Runway 13L ARFF road within Runway 13L-31 R ROFA.

8. Work Area AE
   a. Work Area AE includes portions of the Taxiway Q and Taxiway R1 TOFAs and is bounded on the northeast by the Taxiway R1 TOFA and as shown on the south.
   b. Restrictions and required closures: Work within Area AE requires closure of Taxiway Q between Taxiway EJ and Taxiway R1, and closure of Taxiway R1 between Taxiway R and Taxiway P. Taxiway R1 cannot be closed simultaneously with Taxiway P. Work within Area P must be completed prior to beginning work in Area AE. **Taxiway R1 shall remain open to traffic until Taxiway R and Y construction is complete and open to traffic.**
   c. Work includes: Pavement marking. Placement and demo of taxiway edge lights and electrical signage. Proposed grading and drainage on Taxiway Q.

9. Work Area AF
   a. Work Area AF is bounded by the Taxiway N (future Taxiway R) TOFA on the northwest, the Runway 13L-31R ROFA on the northeast, as shown on the southeast, the Taxiway R TOFA on the southwest.
   b. Restrictions and required closures: Work in Area AF requires closure of Taxiway P. Taxiway P may not be closed at the same time as Taxiway N (future Taxiway R). No stockpiles or equipment may be left within the Runway 13L-31R ROFA. Area AF is also within the Runway 13L POFZ, and work may not occur when Runway 13L is in use.
   c. Work includes: Proposed drainage within Runway 13L-13R RSA.

10. Work Area AJ
    a. Work Area AJ is within the Taxiway R and R1 TOFAs and is bounded on the northeast by the Runway 13L-31R ROFA, as shown on the south, and by the Taxiway Q TOFA on the southwest. Restrictions and required closures: None.
    b. Restrictions and required closures: Work in Area AJ requires closure of Taxiway R between Taxiway EJ and Taxiway P, and closure of Taxiway R1 between Runway 13L-31R and Taxiway Q. ARFF road access must always be maintained. **Taxiway R1 shall remain open to traffic until Taxiway R and Y construction is complete and open to traffic.**

R.——Phase 8 (Base)
   1. Work Area Q
      a. Work Area Q is bounded by the Runway 13L-31R ROFA on the northeast, the Runway 13L-31R RSA on the southwest, and as shown on the northwest and southeast.
SUMMARY OF WORK
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b.a. Restrictions and required closures: Work within Area Q will require the closure of a portion of the ARFF road southeast of Taxiway P. No stockpiles or equipment may be left within the Runway 13L-31R ROFA. The ARFF road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.


2.1 Work Area R

a. Work Area R is bounded by the edge of the ARFF road to the northeast, by the Runway 13L-31R ROFA on the southwest, and as shown on the northwest and southeast.

b.a. Restrictions and required closures: Work within Area R will require the closure of a portion of the ARFF road southeast of Taxiway P. The ARFF road between the East Air Freight Ramp and Runway 13L-31R must always be kept open.


1.3 FORMS

A. The Contractor and all Subcontractors must obtain and pay for all Airport Identification/Access Badges and Access Permits as required by the Airport.

B. All appropriate forms and applications must be obtained, completed and submitted. A minimum required list of forms and applications is as follows:

1. AOA Area Access or Parking Revenue Area (PRA) Access Permits Form (1 page). This form can be obtained from Airport Design, Code, and Construction Department (DCC).

2. Access Badge Application (3 pages). This form can be obtained on the Airport website: https://www.dfwairport.com/badge/

1.4 CONTRACT TIME & SCHEDULE MILESTONES

A. The Contractor shall sequence and stage the Work in accordance with the requirements of the Contract Documents to meet the following interim requirements and Final Completion date.

1. 49580 Consecutive Calendar Days for Substantial Completion of the Base+Alt, from the date set forth in the NTP. 46550 Consecutive Calendar Days for Substantial Completion of the Base, from the date set forth in the NTP 120 consecutive Calendar Days for Final Completion, from the date set forth for Substantial Completion for Base+Alt Bid or Base Bid.

2. Total Contract Time = 61500 Calendar Days for Base+Alt from NTP or 58570 Calendar Days for Base consecutive from NTP.

B. The following milestones apply;

1. Phase 1, All Work Areas shall be completed within 365 calendar days. This phase may start on day 46.
1.2. Phase 3, Work Areas F, G, and L shall be completed within 100 calendar days. This phase will start when the Contractor begins any work in Work Areas F, G, or L.

3. Phase 4, Work Areas H and K shall be completed within 100 calendar days. This phase will start when the Contractor begins any work in Work Areas H or K.

2.4. Phase 6, Work Area T-1 (ARFF Road Construction and Demolition only) shall be complete within 21 calendar days. This phase will start when the Contractor begins any ARFF Road related work in Work Area T-1.

3.5. Substantial completion. Completion of Phases 1 - 78.

C. The Owner reserves the right to request the completion of work based on Milestones established in the Contract Documents.

D. The Owner reserves the right to apply Liquidated Damages associated with the request the completion of work based on Milestones.

1.5 HOURS OF WORK

A. The Work may be performed in all areas up to 24 hours a day, 7 days a week, as necessary to meet the Project completion dates, except as noted below.

B. Exceptions to above work hours:

1. Any Work within an aircraft parking apron and Object Free Area (OFA) of an active Taxiways or Taxilane will be restricted to the following:
   a. From 22:45 hours to 05:15 hours.
   b. Work activities within these areas may be canceled and the area reopened in the event of airfield emergencies, late airline complexes, and unforeseen conditions that could create significant delays to the Airport.

2. There are two types of Holiday Blackout periods. One governs the area within the Air Operations Area (AOA) and the other holiday blackout periods governs the area outside of the Air Operations area. The following construction blackout dates are recognized for the Project:

   a. Airfield Blackout Dates
      1) No airfield closures or lighting circuit lockouts should be scheduled beginning at 2200 hours on Friday night, November 20, 2020 until 2200 hours on Monday night, November 30, 2020.
      2) No airfield closures or lighting circuit lockouts should be scheduled beginning at 2200 hours on Friday night, December 18, 2020 until 2200 hours on Monday night, January 4, 2021.
      3) No airfield closures or lighting circuit lockouts should be scheduled beginning at 2200 hours on Friday night, November 19, 2021 until 2200 hours on Monday night, November 29, 2021.
      4) No airfield closures or lighting circuit lockouts should be scheduled beginning at 2200 hours on Friday night, December 17, 2021 until 2200 hours on Monday night, January 3, 2022.
b. Landside Blackout Dates
The following dates have been established as construction blackout dates in the landside and customer service areas. During the noted landside Holiday blackout dates any work that impacts ramp level operations, roadways, guests inside the terminals and non-emergency utility outage requests, will normally not be approved. Work and utility outages that do not impact stakeholder operations or have limited impact will be evaluated on a case by case basis during the blackout periods. The dates listed are the primary dates and others may follow:

- Spring Break – Thursday, Feb 27 at 00:00 am – Monday, March 16, 2020 at 11:59 pm
- Memorial Day – Thursday, May 21 at 00:00 am through Tuesday, May 26, 2020 at 11:59 pm
- July 4 – Thursday, June 25 at 00:00 am through Friday, July 10, 2020 at 11:59 pm
- Labor Day – Thursday September 3 at 00:00 am through Tuesday, September 8, 2020 at 11:59 pm
- Thanksgiving – Thursday, November 19 at 00:00 am through Tuesday, December 1, 2020 at 11:59 pm
- Christmas/New Year – Friday, December 18, 2020 at 00:00 am through Thursday, January 7, 2021 at 11:59 pm
- Spring Break – Thursday, Feb 25 at 00:00 am – Monday, March 15, 2021 at 11:59 pm
- Memorial Day – Thursday, May 20 at 00:00 am through Tuesday, May 25, 2021 at 11:59 pm
- July 4 – Thursday, July 1 at 00:00 am through Friday, July 9, 2021 at 11:59 pm
- Labor Day – Thursday September 2 at 00:00 am through Tuesday, September 7, 2021 at 11:59 pm
- Thanksgiving – Thursday, November 18 at 00:00 am through Tuesday, November 30, 2021 at 11:59 pm
- Christmas/New Year – Friday, December 17, 2021 at 00:00 am through Thursday, January 6, 2021 at 11:59 pm

c. For all utility outages, a Utility Outage Request form must be submitted seven days in advance to Poweroutage@dfwairport.com. For power outage requests, all impacted panel schedules must be submitted with the request. Operations will review and if needed, coordinate a stakeholder meeting to discuss mitigation plans. One hour prior to all utility outages, the requestor must call the Airport Operations Center at
972-973-3112 one hour prior to the scheduled outage for a final go/no-go. The Utility Outage Request form may be found on https://www.dfwairport.com/operations/ or you may request a form from PowerOutage@dfwairport.com.

PART 2 – PRODUCTS
Not Used.

PART 3 – EXECUTION
Not Used.

PART 4 – MEASUREMENT AND PAYMENT
Not Used.

- END OF SECTION –
PART 1 - GENERAL

This Section covers the requirements for the construction, layout, and furnishing of the Owner's Field Office for the Project including maintenance, service, and removal.

PART 2 - PRODUCTS

The Owner's Field Office shall include more than one (1) desk for support staff of designers, auditors, purchasing agents, computer operators etc. The Owner's Field Office layout and facilities shall comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Texas Accessibility Standards (TAS), whichever is more stringent, and with associated local permitting and inspection regulations. Evidence that the structure itself has been approved by the Airport Design, Code and Construction Department (DCC) shall be required.

Temporary construction trailer (one-triple wide trailer) used for the Owner's Authorized Representative (OAR) shall include stairways, landing platforms, and ADA ramps that comply with the Accessibility Code for buildings and with associated local permitting and inspection regulations. Evidence that the building itself has been approved by the OAR is required.

PART 3 - EXECUTION

3.1 The Owner's Field Office shall meet the following:

A. The Contractor shall provide a minimum of one (1) Construction Field Offices in the Contractor's Staging Area for the OAR's sole use that meets the requirements of Part 2. Any other construction site field offices needed by the Contractor for his/her use shall be supplied by the Contractor.

B. The Construction Site Field Offices shall be located in the Contractor's Staging Area. The site is outside of the air operations area and outside the AOA security fence. Installation of the Construction Field Offices, including all permitting, furnishings, equipment, and utilities shall be completed by the Contractor within fifteen (15) Days of the Notice to Proceed and shall be maintained by the Contractor through the duration of the Project at no additional expense to the
OAR. The Contractor is responsible for the installation and maintenance, including any direct or incidental expenses related to, of power and telecommunications line between Field Office(s) and point of service and the maintenance, use, and upkeep for the duration of the Project. The Contractor is responsible for temporary power and telecommunications service being installed and operational within fifteen (15) days from the Notice to Proceed. Internet Connectivity with a minimum speed of 50 Mbps. The Contractor is responsible for ensuring that the Construction Site Field Office(s) are properly permitted (including, but not limited to plumbing permits).

C. The Contractor’s Staging Area and access thereto shall be kept neat and orderly throughout construction and all deficiencies in the maintenance of this area shall be promptly corrected by the Contractor. The site shall be restored to a condition equal to the condition prior to the start of construction and equal to the condition of areas adjacent to the site and as approved by the OAR. Stockpiling of any material will not be permitted without prior approval of the OAR.

D. The Construction Field Offices for the OAR use shall remain on-site and available to the OAR throughout construction, and through project closeout, and shall have a minimum of two (2) doors and a window area of not less than forty-eight (48) square feet. Windows shall be provided with security bars. All doors and windows shall be provided with screens and secure locks. Provide mini-blinds for all windows.

E. Electric power shall be provided to include a minimum of four (4) 100-volt a/c duplex electric convenience outlets. At least one such outlet shall be located on each wall. The electrical distribution panel shall provide not less than two (2) circuits providing 110-volt, 60-Hertz service.

F. Lighting shall be provided for office to provide illumination at the tables and desk at a level of 100-foot candles. An outdoor lighting fixture with three hundred (300) watts shall be provided at each door.

G. Heating and air conditioning of sufficient capacity shall be provided at no expense to the OAR to adequately control the temperature at all times.

H. The Contractor shall provide integral sanitary facilities within offices for the sole use of office personnel. Sanitary facilities shall include a water closet and washbasin with hot and cold potable running water. Contractor to obtain sanitary sewer permit and provide connection to sanitary sewer or equip trailers with holding tanks that will be maintained daily. Each restroom shall be provided with liquid soap and dispensers, toilet paper and dispenser, toilet seat covers and dispenser, paper towels and dispenser, waste baskets, industrial first aid kits with eye washers, and continuous on-going supply of all disposable goods.

I. Extended area, non-coin-operated telephone service shall be provided within the office area. Contractor shall be responsible for telephone service installation and installation fees. The installation shall include sufficient extension cord to serve the plan table and desk. Telephone system shall include voice mail accessible
from outside phone line and shall accommodate keying in sufficient number of
digits to allow access to outside voice mail by name or by number. Submit
system specifications for the OAR approval. Include connection fees, usage fees,
and full maintenance.

J. Construction Field Offices for the OAR personnel shall be equipped with the
furniture, services and equipment listed below. All furniture, services and
equipment will be maintained by the Contractor upon issuance of the Notice to
Proceed and continue through the duration of the Project at no additional
expense to the OAR.

<table>
<thead>
<tr>
<th>Furniture, Services, and Equipment</th>
<th>OAR Offices</th>
<th>OAR Bull Pen</th>
<th>Conference Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockable, four-drawer file cabinets (legal size)</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>3-shelf bookcases</td>
<td>3</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Metal plan rack, 12 sticks</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>In/Out Mailboxes</td>
<td>6</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Lockable metal supply cabinet</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Refrigerator, minimum 18 cubic feet</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Microwave, minimum 2.0 cubic feet</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Bulletin board and marker board, 4’ x 8’</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Wastebasket</td>
<td>6</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Dry erase board 3’ x 2’ white boards</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Refrigerated bottled water dispenser unit, with hot and cold water dispenser and disposable cup supply</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Conference room with table &amp; chairs to accommodate 10 persons</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Herman Miller Aeron Work Chairs</td>
<td>0</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>Standard size desk with six drawers</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Full Height Cubicles – 5.5 high with integrated storage cabinets -2 and draws suitable for holding file with locks</td>
<td>0</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Color Copy/Scan Machine with at least following features: Plain paper, dry toner type and capable of printing/scanning 11”x17” documents via feeder. This includes paper and all other necessary accessories.</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FAX machine with dedicated phone line</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Hard wired telephone and internet connection jacks</td>
<td>3</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

3.2 PARKING FACILITIES
The Contractor shall provide well drained, graded paved, or well compacted gravel surface for use by the Owner's staff. Provide not less than 10 parking spaces for standard sedans and pickup trucks.

3.3 MAINTENANCE AND CLEANING
   A. Daily janitorial service shall be provided for offices with periodic cleaning and maintenance for storage areas.
   B. The Contractor shall maintain approach walks free of mud and water.
   C. The Contractor shall be responsible for all costs associated with equipment and services provided for the Owner’s Field Office, including costs for equipment and/or services which are provided by the Contractor, but which are not specifically required by this Section.

3.4 REMOVAL
   A. At Final Completion of the Project Work, or earlier if agreed by the Owner’s Authorized Representative (OAR), the Contractor shall remove the structure(s), foundation, utility services, and all remaining debris and restore the area to its original condition to the satisfaction of the OAR.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT
   A. Owner’s field office will be measured for each month or partial month of the project duration.

4.2 PAYMENT
   A. Owner’s field office will be paid for each month the office is required to be in service for the project duration.

Payment will be made under:
Item 01 50 13-1 Owner’s Field Office – per Month

- END OF SECTION -
PART 1 - GENERAL

1.1 SUMMARY

This Section includes the following:

A. Mobilization of equipment, personnel, material, supplies, tools, and all other resources necessary prior to beginning the Work.

B. Establishment of temporary facilities and all other facilities necessary prior to beginning the Work, including the construction of any new, and maintenance of existing and new haul roads.

C. When a staging area is required in the Plans, the Contractor shall abide by the Land Use Application provided in Section 01 71 14.01.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 PROJECT INITIATION

A. The Mobilization fee shall not exceed teneight (108) percent of the total Contract Amount.

B. The Contractor shall complete all required coordination and forms, submit permits and insurance certificates prior to beginning any construction activity.

C. The Contractor may complete all required temporary facilities as outlined in the Division 01 Sections prior to other construction activities and complete the move-in process after the Land Use Application has been completed and approved.

D. The Contractor shall coordinate with the Owner’s Authorized Representative (OAR) to establish the Project submittals procedures, Baseline Schedule and payment procedures.

3.2 FINAL CLEANUP

Complete clean up and submit all required final documentation prior to move-out.

PART 4 – MEASUREMENT AND PAYMENT

A. Measurement

Measurement of the item "Mobilization" will be by the "Lump Sum," as the Work progresses as specified in the Contract.

B. Payment

1. When one (1) percent of the Contract Amount has been earned by the Contractor, 50 percent of the Mobilization Pay Item or five (5) percent of the total Contract Amount, whichever is less, will be paid. Previous payments under this item will be deducted from this amount.

2. When five (5) percent of the Contract Amount has been earned, 75 percent of the Mobilization Pay Item, or ten (10) of the total Contract Amount, whichever is less, will be paid. Previous payments under this item will be deducted from this amount.
3. When ten (10) percent of the Contract Amount is earned, 90 percent of the Mobilization Pay Item or 15 percent of the total Contract Amount, whichever is less, will be paid. Previous payments under this item will be deducted from this amount.

4. Upon completion of all Work under this Contract, payment for remainder of the Mobilization Pay Item will be paid.

Payment will be made under:

Item 01 71 13-1  Mobilization (South) - per Lump Sum
Item 01 71 13-2  Mobilization (North) – per Lump Sum

- END OF SECTION -
ITEM M-007 RIP-RAP APRON

DESCRIPTION

007-1.1 This item shall consist of the installation of rip-rap at the location shown on the plans.

MATERIALS

007-2.1 RIP RAP. The rip rap for the channel shall meet the requirements of TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (November 1, 2014) specification 432, for protection stone, with a maximum aggregate size of 24 inches.

CONSTRUCTION METHODS

007-3.1 RIP RAP. The rip rap for the channel shall be constructed per the requirements of TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (November 1, 2014) specification 432.

Aggregate larger than 12 inches shall be placed as directed by the RPR in a manner to mitigate the flow velocity.

METHOD OF MEASUREMENT

007-4.1 RIP RAP. The quantity of rip rap will be determined by measurement of the number of square yards of material actually constructed and accepted by the Engineer as complying with the plans and specifications.

BASES OF PAYMENT

007-5.1 RIP RAP. The basis of payment will be made at the contract unit price per square yard of rip rap installed at a uniform depth as measured and accepted in accordance with paragraph 4.7. This price shall be full compensation for furnishing all materials, geotextile, labor, equipment, tools, backfill, hauling, and incidentals necessary to complete the item.

Payment will be made under:

Item M-007-5.1 Rip-Rap – per square yard

END OF ITEM M-007
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ITEM P-101 DEMOLITION AND ABANDONMENT

DESCRIPTION

101-1.1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans. The remediation of the asbestos in the existing concrete joints shall be performed in accordance with the Asbestos Inspection Report attached to this specification.

EQUIPMENT AND MATERIALS

101-2.1 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

101-2.2 All waste material shall be disposed of offsite at a licensed disposal site approved for waste materials in accordance with Section 01 74 19, unless specified otherwise.

CONSTRUCTION

101-3.1 REMOVAL OF EXISTING PAVEMENT. 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.

a) Concrete pavement removal. Prior to the removal of any concrete pavement the asbestos in the joints must be remediated in accordance with the Asbestos Inspection Report attached to this specification. 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. If the material is to be wasted on the airport site, it shall be crushed in accordance with Item M-002. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the RPR. Any concrete slurry generated from the sawing and subsequent removal shall be cleaned up immediately and continuously to the satisfaction of the RPR.

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 underlaying material that is to remain in place, shall be recompacted and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor’s expense.

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. If the material is to be wasted on the airport site, it shall be broken to a maximum size of 1.5 inches.
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 RPR. 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.

d) **Stabilized Base.** Stabilized base consists of cement treated/ stabilized subbase. The existing stabilized base to be removed shall be freed from the stabilized base to remain by sawing through the complete depth of the stabilized base at final removal limits. The stabilized base within 2 feet of this saw cut shall be carefully broken up and removed using hand-held jackhammers, weighing 30 pounds or less, or other light duty equipment which will not cause distress in the stabilized base that is to remain. Outside of this area the Contractor shall use methods that will not cause damage to the underlying subbase material. Once removed the stabilized base shall be disposed of off airport property. Any damage to the underlying course or stabilized base to remain shall be repaired to the satisfaction of the RPR at no additional cost to the Owner.

**101-3.2 MILLING.** Milling shall be performed with a power-operated milling machine or grinder, capable of producing a finished surface that provides a good bond to the new overlay. The milling machine or grinder shall operate without tearing or gouging the under-layering surface. The milling machine or grinder shall be equipped with automatic grade and slope controls. All millings shall be removed and disposed of Airport property, unless otherwise specified. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material that was removed with new material at no additional cost to the Owner.

a) **Clean-up.** The Contractor shall sweep the milled surface daily and immediately after the milling until all residual aggregate and fines are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or below the surface to remove any remaining aggregate or fines.

**101-3.3 REMOVAL OF STORM PIPE AND OTHER UTILITIES.**

a) **Storm pipe removal.** Pipe Removal shall include the demolition of drainage piping as designated on the Plans. Removal shall be performed in a manner that does not disrupt the conveyance of the system that is being demolished. Where the limit of pipe removal is at a structure it shall be neatly cut from the pipe that is to remain. Where the limit of pipe removal is at a structure that is to remain, the pipe shall be neatly cut at a distance of no more than 12 inches from the structure and capped in a manner that is acceptable to the RPR. The section of pipe remaining shall be filled flush with the interior wall of the structure with CLSM. Any damage to remaining pipes or structures shall be repaired by the Contractor, at no additional cost to the Owner, to the satisfaction of the RPR. The void remaining after the drainage pipe removal shall be restored in accordance with Paragraph 101-3.10. Removed pipe shall be disposed in accordance with Paragraph 101-2.2.

b) **Conduit and Ductbank Removal.** Conduit Removal and Duct Bank shall consist of the removal of electrical conduit or ductbanks as depicted on the Plans. Prior to the removal of any conduit or Duct Bank the Contractor shall insure that all cabling has been removed in accordance with Item L-105. The conduit shall be neatly cut at the limit of removal. Any damage to conduits that are to remain in place shall be repaired by the Contractor to the satisfaction of the RPR, at no additional cost to the Owner. Where the removal limit is indicated at a structure the Contractor shall neatly cut and carefully remove the duct bank or conduit a minimum of 12-inches from the outside face of the structure. All conduits or ducts shall be capped in a manner to allow for future connections. The void remaining following the removal of the conduit or duct bank shall be restored in accordance with Paragraph 101-3.10. All materials removed shall be disposed of in accordance with Paragraph 101-2.2.
101-3.4 REMOVAL OF STRUCTURES.

a) Miscellaneous Structure Removal. Miscellaneous structure removal shall include the demolition of inlets, storm manholes, storm pipe end treatments, airfield guidance sign foundations, transformer foundations, electrical manholes, electrical handholes, and any other structures not defined in this specification as depicted on the plans.

1) Structures less than or equal to five feet below finish grade: For structures that are 5 feet deep or less in relationship to finish grade the Contractor shall remove the entire structure. The void remaining following the removal of the foundation shall be restored in accordance with Paragraph 101-3.10. All materials removed shall be disposed of in accordance with Paragraph 101-2.2.

2) Structures greater than five feet below finish grade: For structures that are deeper than 5 feet below finish grade, the top section of the structure that is within 5 feet of finish grade shall be removed from the structure. The remaining structure shall be broken up into smaller pieces no larger than 2 feet in any dimension. The removed portion of the structure can be disposed of within the structure remaining in place. Following the demolition of the structure the void spaces shall be filled with CLSM. The void remaining following the placement of the CLSM shall be restored in accordance with Paragraph 101-3.10. All materials removed shall be disposed of in accordance with Paragraph 101-2.2.

101-3.5 REMOVAL OF FENCING.

a) AOA Fence and Mow Strip Removal. The removal of the AOA fence and mow stripe shall include the removal of the chain link AOA fencing, barbed wire, razor wire, concrete mow strip at the base of the fence, and any foundations associated with the fence post or CASS post as depicted on the Plans. No removal of the AOA fence shall begin until the new AOA fence and associated connection points have been installed and accepted by the RPR. No break in the fencing will be permitted at any time. All signage on the fence and chain link fabric shall be turned over to the Owner in the same condition as they exist. The void(s) remaining following the removal of the foundations and mow strip shall be restored in accordance with Paragraph 101-3.10. All materials removed that are not turned over to the Owner shall be disposed of in accordance with Paragraph 101-2.2.

b) Non-AOA Fence Removal. The removal of the Non-AOA fence shall include the removal of the chain link fencing, gates, and any foundations associated with the fence post as depicted on the Plans. All signage on the fence shall be turned over to the Owner in the same condition as they exist. The void(s) remaining following the removal of the foundations shall be restored in accordance with Paragraph 101-3.10. All materials removed shall be disposed of in accordance with Paragraph 101-2.2.

c) Cass Removal. The removal of the CASS adjacent to the AOA fence consist of the removal of the post and wire system above the elevation of the concrete mow strip. All material removed shall be disposed of off in accordance with Paragraph 101-2.2.

d) Concrete Barrier Removal. The concrete barriers shall be removed at the locations shown on the plans. All materials removed shall be disposed of in accordance with Paragraph 101-2.2.

101-3.6 BOLLARD REMOVAL. Bollard Removal consist of the removal of bollards and their associated foundations at the locations depicted on the Plans. The removal of the bollards adjacent to the AOA fencing shall not be removed until approved by the RPR. The void remaining following the removal of the bollard shall be restored in accordance with Paragraph 101-3.10. All material shall be disposed of in accordance with Paragraph 101-2.2.

101-3.7 ROADWAY SIGN REMOVAL. The removal of roadway signs consists of the removal of the sign, post, and associated foundation. The void remaining following the
removal of the foundation shall be restored in accordance with Paragraph 101-3.10. The sign shall be turned over to the Owner and all other material shall be removed shall be disposed of in accordance with Paragraph 101-2.2.

**101-3.8 LIGHT BASE REMOVAL**

   a) **In Asphalt Pavement or Turf.** Light Base Removal in Bituminous Pavement or Turf shall consist of the removal of L-867 or L-868 light bases at the locations depicted on the Plans. Prior to the removal of the light base all fixtures, cable, transformers, and any other electrical appurtenances shall be removed from the base can in accordance with Item L-105. Any damage to conduits that are to remain in place shall be repaired by the Contractor, at no additional cost to the Owner, to the satisfaction of the RPR. The void remaining following the removal of the foundation shall be backfilled and compacted in accordance with Paragraph 101-3.10. All materials removed shall be disposed of in accordance with Paragraph 101-2.2.

   b) **In PCC Pavement.** Light Base Removal in PCC Pavement shall consist of the removal of a L-867 or L-868 light bases at the location depicted on the Plans. Prior to the removal of the light base all fixtures, cable, transformers, and any other electrical appurtenances shall be removed from the base can in accordance with Item L-105. Following the removal of the PCC pavement and prior to the removal of the base can the Contractor shall core the stabilized base course a minimum diameter of 3-feet centered on the base can. The void remaining following the removal of the base can shall be filled in accordance with Item L-123. All materials removed shall be disposed of in accordance with Paragraph 101-2.2.

**101-3.9 ABANDONMENT OF UTILITIES OR STORMPIPES.** When the size of the utility is smaller than 2 inches in diameter, the utility shall be capped in a manner that is acceptable to the RPR and abandoned in place. When the size of the utility is larger than 2 inches in diameter it shall be filled solid by pumping grout or CLSM into the utility and capped. Prior filling the pipe that is to be abandoned the Contractor shall excavate and cap the downstream end of the pipe and core or punch a 6-inch diameter weep holes in the top of the pipe at an interval of no more than 50 feet in turf areas. This interval may be increased as directed by the RPR based on Contractor’s performance. The purpose of the weep hole is to ensure the pipe is filled solid. Upon the completion of the filling of pipes any excavated area shall be restored in accordance with Paragraph 101-3.10.

**101-3.10 RESTORATION.** Following the removal, demolition, or abandonment of the various items the Contractor shall restore the area as described below:

   a) **Turf Areas.** In turf areas outside of the limits of the site grading the Contractor shall backfill the void created as a result of demolition activities with material that is similar to the surrounding material not affected by the demolition activities. This material shall be placed and compacted in accordance with Item P-152 to the same elevation as the surrounding area. Following the placement of this material the area shall be seeded and mulched in accordance with Section 32 92 19.

   In turf areas that are within the limits of the site grading the Contractor shall backfill the void created as a result of the demolition activities with material that is similar to the surrounding material not affected as a result of the demolition activities. This material shall be placed and compacted in accordance with Item P-152 to the elevation of the surrounding area.

   b) **Under New Paved Areas.** In areas that will be paved the void remaining following the demolition activities shall be backfilled with CLSM to the bottom of the over excavation.

   c) **Gravel Areas.** In gravel areas, the void remaining following the demolition activities shall be backfilled with material that is similar to the surrounding material not affected
by the demolition activities. This material shall be placed and compacted in accordance with Item P-152 to the bottom elevation of the existing gravel. The gravel shall be replaced in-kind with the material that was removed as part of the demolition activities.

**METHOD OF MEASUREMENT**

101-4.1 **PAVEMENT OR STABILIZED BASE REMOVAL.** The measurement for pavement removal shall be per each square yard of pavement removed and accepted by the RPR based on the depth shown on the plan regardless of the in-place depth.

101-4.2 **MILLING.** Measurement for payment of milling of asphalt and concrete shall be made per square yard based on the area shown on the plans. Any milling of pavement outside the preapproved 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. Milling shall include all sawcutting, hauling and disposal (including disposal fees) of pavement necessary to facilitate removal.

101-4.3 **ABANDONMENT OF UTILITIES OR STORM PIPES.** The measurement for the abandonment of utilities or storm pipes shall be measured by the linear foot of the utility abandoned in place and accepted by the RPR. Measurement shall be along the centerline of the pipe to the limit shown on the plans. Where the limit is at a structure the measurement shall be to the inside face of the structure.

101-4.4 **REMOVAL OF STORM PIPES.** The removal of storm pipe shall be measured by the linear foot of storm pipe removed and accepted by the RPR. Measurement shall be made along the centerline of the pipe from the outside face of the adjoining structure(s).

101-4.5 **AOA FENCE AND MOW STRIP REMOVAL.** The measurement for the removal of the AOA fence and mow strip shall be based on the linear feet of fencing that is removed and accepted by the RPR. Measurement shall be based on the distance along the ground along the centerline of the fence from the center of the post that is to remain or at bends in the fence.

101-4.6 **BOLLARD REMOVAL.** The measurement of bollards removed shall be per each bollard removed and accepted by the RPR.

101-4.7 **REMOVAL OF LIGHT BASE IN BITUMINOUS PAVEMENT OR TURF.** The measurement for the removal of light bases in bituminous pavement or turf shall be per each light base removed and accepted by the RPR.

101-4.8 **REMOVAL OF LIGHT BASE IN PCC PAVEMENT.** The measurement for the removal of light bases from PCC pavement shall be per each light base removed and accepted by the RPR.

101-4.9 **REMOVAL OF CONDUIT OR DUCTBANK.** The removal of conduit or ductbanks shall be measured by the linear foot for duct bank or conduit removed and accepted by the RPR. Measurement shall be made along the centerline of the conduit or duct bank from the outside face of structures when the limit of removal is at a structure.

101-4.10 **ROADWAY SIGN REMOVAL.** The measurement for the removal of roadway signs shall be per each sign removed and accepted by the RPR.
101-4.11 REMOVAL OF MISCELLANEOUS STRUCTURES. The measurement of miscellaneous structures shall be made per each miscellaneous structure removed and accepted by the RPR.

101-4.12 REMOVAL OF ASBESTOS JOINT COMPOUND. The measurement of asbestos joint removal shall be made per the linear foot of joint seal containing asbestos that is removed and accepted by the RPR.

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.

Item P-101-5.1 Removal of Reinforced Concrete Pavement (15 to 20-Inch) – per square yard
Item P-101-5.2 Removal of Reinforced Concrete Pavement (6 to 8-Inch) – per square yard
Item P-101-5.3 Removal of Asphalt Pavement (Less Than or Equal To 6-Inch) – per square yard
Item P-101-5.4 Removal of Asphalt Pavement (Greater Than 6-Inch) – per square yard
Item P-101-5.5 Milling of PCC Pavement – per square foot
Item P-101-5.6 Abandonment of Storm Pipe – per linear foot
Item P-101-5.7 Removal of Storm Pipe (Inner Diameter Less Than or Equal To 42-Inch) – per linear foot
Item P-101-5.8 Removal of Storm Pipe (Inner Diameter Greater than 42-Inch) – per linear foot
Item P-101-5.9 CASS Removal – per linear foot
Item P-101-5.10 AOA Fence and Mow Strip Removal – per linear foot
Item P-101-5.11 Bollard Removal – per each
Item P-101-5.12 Light Base Removal in Bituminous Pavement or Turf – per each
Item P-101-5.13 Light Base Removal in PCC Pavement – per each
Item P-101-5.14 Conduit Removal – per linear foot
Item P-101-5.15 Ductbank Removal – per linear foot
Item P-101-5.16 Roadway Sign Removal – per each
Item P-101-5.17 Structure Removal (Less Than or Equal To 5-Foot Depth) – per each
Item P-101-5.18 Structure Removal (Greater Than 5-Foot Depth) – per each
Item P-101-5.19 Asbestos Joint Removal – per linear foot
Item P-101-5.20 Removal of Stabilized Base – per square yard
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.

APPENDIX

Appendix A: Limited Asbestos Inspection. A Limited Asbestos Inspection was performed on buildings used for airfield operations in the Airfield Operations Area.

END OF ITEM P-101
ITEM P-620 RUNWAY AND TAXIWAY MARKING

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

MATERIALS

620-2.1 MATERIALS ACCEPTANCE. The Contractor shall furnish manufacturer’s certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 MARKING MATERIALS.

<table>
<thead>
<tr>
<th>Table 1. Marking Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>Waterborne</td>
</tr>
<tr>
<td>Waterborne</td>
</tr>
<tr>
<td>Waterborne</td>
</tr>
<tr>
<td>Waterborne</td>
</tr>
</tbody>
</table>

1 See paragraph 620-2.2a
2 See paragraph 620-2.2b

**Paint.** Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type I. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.
b. **Reflective media.** Glass beads for white, yellow, and red paint shall meet the requirements for Federal Specification TT-B-1325D and be of the type shown in Table 1.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black and green paint or in any temporary paint.

### CONSTRUCTION METHODS

**620-3.1 WEATHER LIMITATIONS.** Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer’s recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer’s recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers’ recommendations for application and dry time.

**620-3.2 EQUIPMENT.** Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

**620-3.3 PREPARATION OF SURFACES.** Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminants that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. **Preparation of new pavement surfaces.** The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. **Preparation of pavement to remove existing markings.** Existing pavement markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to ‘block out’ the removal area to eliminate ‘ghost’ markings. Any damage to the existing joint seal shall be repaired in accordance with P-605 or P-604 to the satisfaction of the RPR. Wastes associated with paint removal activities should be tested for lead and chromium content prior to disposal.
c. **Preparation of pavement markings prior to remarking.** Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris. *Any damage to the pavement joint seals shall be repaired in accordance with P-605 to the satisfaction of the RPR prior to remarking.*

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

**620-3.4 LAYOUT OF MARKINGS.** The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

**620-3.5 APPLICATION.** A period of 30 days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

Temporary markings shall be applied where indicated on the drawings and when a pavement will open to traffic prior to the 30-day period above. All temporary markings shall be applied at double the application rate shown in Table 1. No black outline or glass beads are required for temporary markings.

The edges of the markings shall not vary from a straight line more than 1/2-inch in 50 feet, and marking dimensions and spacing shall be within the following tolerances:

<table>
<thead>
<tr>
<th>Dimension and Spacing</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-inch or less</td>
<td>±1/2-inch</td>
</tr>
<tr>
<td>greater than 36-inch to 6 feet</td>
<td>±1 inch</td>
</tr>
<tr>
<td>greater than 6 feet to 60 feet</td>
<td>±2-inch</td>
</tr>
<tr>
<td>greater than 60 feet</td>
<td>±3-inch</td>
</tr>
</tbody>
</table>

The paint shall be mixed in accordance with the manufacturer’s instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.
620-3.6 APPLICATION--PREFORMED THERMOPLASTIC AIRPORT PAVEMENT MARKINGS. Preformed thermoplastic pavement markings not used.

620-3.7 CONTROL STRIP. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 RETRO-REFLECTANCE. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6-square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

<table>
<thead>
<tr>
<th>Material</th>
<th>Retro-reflectance mcd/m²/lux</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
</tr>
<tr>
<td>Initial Type I, Gradation A</td>
<td>-</td>
</tr>
<tr>
<td>Initial Type III</td>
<td>600</td>
</tr>
<tr>
<td>All materials, remark when less than¹</td>
<td>100</td>
</tr>
</tbody>
</table>

¹ Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance.

620-3.9 PROTECTION AND CLEANUP. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfigurement by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

620-3.10 MARKING REMOVAL. Existing markings must be completely removed as shown on the plans in a manner that will minimize damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris. Any damage to the pavement joint seals shall be repaired in accordance with P-605 to the satisfaction of the RPR.

METHOD OF MEASUREMENT

620-4.1 The quantity of markings to be paid for shall be measured by the number of square feet of painting.

620-4.2 The quantity of temporary markings to be paid for shall be the number of square feet of painting performed in accordance with the specifications and accepted by the RPR. Temporary marking includes surface preparation, application and complete removal of the temporary marking.
620-4.3 The quantity of marking removal to be paid for shall be measured by the number of square feet of markings removed in accordance with the specifications and accepted by the RPR.

620-4.4 The quantity of surface painted signs to be paid for shall be measured by each surface painted sign marked in accordance with the specifications and accepted by the RPR.

BASIS OF PAYMENT

620-5.1 Payment for markings shall be made at the contract price for the number of square feet of painting. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.2 Payment for temporary markings shall be made at the contract price for the number of square feet of painting. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.3 Payment for marking removal shall be made at the contract price for the number of square feet of markings removed. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.4 Payment for surface painted signs shall be made at the contract price for each surface painted sign painted. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

Payment will be made under:

Item P-620-5.1 Reflective Marking – per square foot
Item P-620-5.2 Non-Reflective Marking – per square foot
Item P-620-5.3 Temporary Marking – per square foot
Item P-620-5.4 Marking Removal – per square foot
Item P-620-5.5 Surface Painted Sign – per each

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)


Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F  Paint, Traffic and Airfield Marking, Waterborne
FED STD 595      Colors used in Government Procurement

END OF ITEM P-620
ITEM L-103 TEMPORARY LIGHTING, SIGNING, AND NAVAIDS

DESCRIPTION

103-1.1 GENERAL. This work shall include but is not limited to the following:

a. Installing, protecting and maintaining temporary airfield lighting and signing.

b. Coordinating with the FAA and Airfield Operations to maintain their systems according to during construction phasing or work area.

c. Removal, modifying, disposal and/or salvage of temporary airfield lighting, signing and NAVAID systems.

103-1.2 RELATED DOCUMENTS. The General Provisions, Special Provisions and Supplementary Conditions apply to work specified in this Item.

103-1.3 APPLICABLE DOCUMENTS. The publications listed at the end of this Item are incorporated herein by reference and form a part of this Item to the extent indicated by the references thereto. Except where a specific date is given, the issue in effect (including amendments, addenda, revisions, supplements, and errata) on the date of this solicitation shall be applicable. In the text of this Item, such publications are referred to by basic designation only. Additional details and specifications pertaining to a specific system are contained in these documents and are to be considered as part of this Item. Perform all work in accordance with these documents except as specified herein. In the event of a conflict between contract documents and the referenced documents, the more stringent rule shall be applied.

MATERIALS

103-2.1 GENERAL. Airport lighting equipment and materials covered by FAA specifications shall have the prior approval of the Federal Aviation Administration, Airports Service, Washington, D.C. 20590, and shall be listed in Advisory Circular 150/5345-53, Airport Lighting Equipment Certification Program, current edition. All equipment and materials not listed in Advisory Circular 150/5345-53 shall be suitable for their intended purpose and will be adequately protected against corrosion. Any plastic components exposed to sunlight shall be made of UV stabilized material. All fasteners shall have corrosion protection. Copper bearing hardware in contact with aluminum shall be plated with cadmium, nickel, and zinc. All hardware used for access for maintenance shall be stainless steel.

103-2.2 LIGHT BASE. The contractor shall provide the temporary light base as described in the plans.

103-2.3 ISOLATION TRANSFORMER. Existing isolation transformers which are removed as part of this project are to be used for temporary lighting. The transformer current and wattage rating shall be appropriate for the fixture.

103-2.4 HARDWARE. All bolts, nuts, washers and lock-washers shall be stainless steel.
103-2.5 **PLUG AND RECEPTACLE CABLE CONNECTORS.** L-823, Type I, Class A, meeting the requirements of FAA AC 150/5345-26 as required.

103-2.6 **CONCRETE.** Concrete shall meet the requirements of Item P-610.

103-2.7 **UNDERGROUND ELECTRICAL CONDUIT AND DUCT.** Equipment and materials shall be in accordance with Item L-110.

103-2.8 **CABLE.** Equipment and materials shall be in accordance with Item L-108. The Contractor has the option to reuse cable for temporary circuit use only. Any cable to be reused must have been initially installed as temporary cable on this project. This cable is to be used within the cable rating requirements and in accordance with Item L-108.

103-2.9 **GROUNDING.** Equipment and materials shall be as described on the plans and details.

103-2.10 **GROUND RODS.** Ground rods shall be in accordance with Item L-108.

103-2.11 **BLANK COVER PLATES.** Equipment and materials shall be in accordance with Item L-867 and L-868 as described in AC 150/5345-42.

103-2.12 **TEMPORARY SIGN COVER.** Sign cover shall be blank legend panels to match existing sign manufacturer as described in AC 150/5345-44 and indicated in the drawings.

103-2.13 **TEMPORARY JUNCTION BOXES.** Temporary junction boxes shall be existing light base cans salvaged from the project site.

103-2.14 **TEMPORARY AIRFIELD AND NAVAID CABLE.** The temporary airfield and NAVAID cable shall meet the requirements of Item L-108 for the specific cables.

103-2.15 **TEMPORARY CONDUIT.** Conduit for temporary lighting and signing circuits shall be Rigid Galvanized Steel (RGS) Conduit minimum size 1.5 inch.

**CONSTRUCTION METHODS**

103-3.1 **EXISTING UTILITIES.** Prior to any excavation or trenching the Contractor shall verify any existing cables and utilities, which will be crossed by the trench. The Contractor shall use extreme care while digging in this area and it is the Contractors’ responsibility to repair any damage, which occurs at no additional cost to the Owner.

103-3.2 **NOTIFICATION OF TESTING.** The Contractor shall notify the Engineer a minimum of 48 hours in advance of system, or partial system testing, including but not limited to, installed cable megger testing, operational testing of any modified lighting circuit and fixture testing.

103-3.3 **TESTING.** Testing shall be in accordance with applicable sections of Items L-108 and L-125.

103-3.4 **TEMPORARY CABLE REMOVAL.** Once a temporary circuit or portion thereof is no longer required, the cable for that circuit shall be removed for reuse or disposal. All cables in a single conduit shall be removed in a single pull.
103-3.5 **REUSED TEMPORARY CABLE.** Cable previously installed under this project as temporary cable may be reused for other temporary circuits only. All cables shall be inspected for damage before reuse. The cable shall be installed and tested in accordance with Item L-108. If for any reason the reused cable fails, it shall be replaced at the Contractor’s expense.

103-3.6 **ELECTRICAL REQUIREMENTS.** Conform to applicable sections of the NEC and local codes. All electrical connections shall be made via watertight plugs and receptacles to allow the unit to pull free in the event it is struck by aircraft. Install all underground cable in accordance with Item L-108. Use splices or appropriate plugs for cable connections as specified in Item L-108.

All wiring entering the NAVAIDS must be through plugs and receptacles that will separate if the box is struck by an aircraft. The receptacles are located and held at the frangible point on the breakable coupling. All underground connections will be made with FAA approved splices or plugs and receptacles intended for that use.

103-3.7 **INSTALLATION OF TEMPORARY ELECTRICAL SYSTEMS**

a. **Lighting.** Connect temporary circuits as shown on the plans and test fixtures.

b. **Signing.** Remove legend panels directing aircraft toward closed pavement. The Contractor will be required to procure and install blank sign panels that are compatible with existing sign manufacturer as shown on the drawings.

103-3.8 **RESTORATION OF TEMPORARY EQUIPMENT.** Temporary electrical equipment is to be removed or restored to its original arrangement when it is no longer required. The blank sign panels shall be turned over to the Airport, as directed by the Engineer.

All temporary cable and exposed conduit are to be removed from the site and disposed of properly. Restoration of temporary items as described above shall be considered incidental to the various associated pay items; there will be no separate pay items for this work.

103-3.9 **TEMPORARY JUNCTION BOXES.** Handholes for the by-pass ducts shall be installed as described in section L-115 of the specifications and as shown on the plans. Extreme care shall be used to prevent interrupting the existing buried cables. Coordinate with the proposed drainage and pavement section installation in the area as shown on the plans.

103-3.10 **BY-PASS DUCTBANK.** The ductbank shall be installed as described in section L-110 of the specifications and as shown on the plans. Backfill material shall be select backfill as described in Item P-152.

103-3.11 **TEMPORARY NAVAID CABLE.** The cable installation shall include the cable configuration for the MALSR, ALSF II, and glideslope cable by-pass installation. Included in this item is locating the existing cable, connecting and extending the cable to handhole and duct system. This work must be done in such a manner as to ensure the existing NAVAID circuits are kept in operation as required for the construction phasing.

103-3.12 **TRENCHING FOR DIRECT BURYED CABLES.** Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Road patrols or graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches below finished grade.
The Contractor shall excavate all cable trenches to a width not less than 6 inches. The trench shall be widened where more than two (2) cables are to be installed parallel in the same trench. Unless otherwise specified in the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock excavation is encountered, the rock shall be removed to a depth of at least 3 inches below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All excavation shall be unclassified.

103-3.13 CABLE INSTALLATION IN TRENCHES. The Contractor shall not use a cable plow for installing the cable. Mechanical cable-laying equipment may be used and should provide for physical inspection of cable prior to backfilling. Sharp bends or kinks in the cable shall not be permitted. Cables shall be unreeled in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one (1) end.

Where two (2) or more cables are laid parallel in the same trench, they shall be placed laterally a minimum distance of 3 inches apart, and the trench shall be widened sufficiently to accomplish this. Cables crossing over each other shall have a minimum of 3-inch vertical displacement with the topmost cable depth at or below the minimum required depth below finished grade.

Not less than 1 foot of cable slack shall be left on each side of all connections placed in the trench in a series of S curves. Additional slack cable shall be left in handholes, manholes, etc., where it is required to bring the cable above ground level to make connections. The amount of slack cable shall be stipulated by the Engineer, or as shown in the plans and specifications.

103-3.14 TRENCH BACKFILLING AND RESTORATION. After the cable has been installed in the trench the first layer of backfill shall be 3 inches deep, loose measurement, and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. This layer shall not be compacted. The second layer shall be 5 inches deep, loose measurement, and shall contain no particles that would be retained on a 1-inch sieve. The remainder of the backfill shall be excavated or imported mineral and shall not contain stone or aggregate larger than 4 inches maximum diameter. The third and subsequent layers of the backfill shall not exceed 8 inches in maximum depth, loose measurement.

The second, and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent undisturbed soil, and to the satisfaction of the Engineer. If necessary to obtain the desired compaction, the backfill material shall be moistened or aerated as required.

Trenches shall not be excessively wet and shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement. Any excess excavated material shall be removed and disposed of in accordance with instructions issued by the Engineer.

All areas disturbed by the trenching, storing of dirt, cable laying, pad construction, and other work shall be restored to its original condition as soon as possible. The restoration shall include any necessary topsoiling, fertilizing, liming, seeding or mulching. All such work shall be
performed in accordance with Section 32 92 19 of these specifications. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance.

103-3.15 Conduit for temporary lighting and signing circuits shall be Rigid Galvanized Steel (RGS) Conduit minimum size 1.5 inch. This item includes conduit connections, fittings, modifications to existing equipment and restoration as required.

METHOD OF MEASUREMENT

103-4.1 TEMPORARY SIGN MODIFICATIONS. The quantity of signs modified to be paid for under this item measured shall be the number of each sign modified, regardless of the number of sides or panels as lump sum and shall include all work described in this specification, including, but not limited to, providing and installing blank sign panels, lighting fixture modifications, restoration, and other materials associated with the temporary work required to complete the temporary signing installations, tested and installed as complete in accordance with the plans and specifications and as accepted by the RPREngineer.

103-4.2 TEMPORARY CIRCUITING CABLE. The quantity to be measured shall be measured by the linear foot for cable(s) installed in conduit regardless of number of cables or exposed or buried conduit, in place and accepted by the RPR. This price shall be full compensation for furnishing all materials, connections, trenching, conduit, preparation, restoration, and all labor, equipment, tools and incidentals necessary to complete the item, lump sum for the temporary power cables to de-energize airfield lighting circuits within closed areas, ready for operation and accepted by the Engineer. The item shall include all cable terminations and connecting devices.

103-4.21 TEMPORARY LIGHTING AND SIGN WORK. The quantity to be measured shall be lump sum and shall include all temporary lighting and signage work described in this specification which is not included in Temporary Signage Work and Temporary Circuiting. This price shall include, but not limited to, circuit by-pass connections, covering or disconnecting lights, circuit investigation, restoration, and coordination required to maintain airfield operations as directed by the construction phasing and the RPR.

BASIS OF PAYMENT

103-5.1 TEMPORARY SIGN MODIFICATION LIGHTING AND SIGNAGE. Payment will be made at the contract lump sum per each price for the completed and accepted temporary sign electrical installations and accepted by the RPR. This price shall be full compensation for the installation of blank sign panels, light fixture modifications, furnishing all materials and for all preparation, assembly, mounting hardware, and installation of the requirements specified in this item, and for all labor, equipment, tools and incidentals necessary to complete the item.

103-5.2 TEMPORARY CIRCUITING CABLE IN DUCT OR CONDUIT. Payment will be made at the contract lump sum linear foot price for the cable and installed in conduit or duct, in place; and accepted by the RPREngineer. This price shall be full compensation for furnishing all equipment, materials, connectors, trenching, cable, conduit, preparation, and all labor, equipment, tools, and incidentals necessary to complete the item.

103-5.21 TEMPORARY LIGHTING AND SIGN WORK. Payment will be made at the contract lump sum price for the completed and accepted temporary signing and lighting installations and accepted by the RPR. This price shall be full compensation for furnishing all
materials and for all preparation, storage means, and for all labor, equipment, tools, incidentals, and appurtenances necessary to maintain these items in new condition in accordance with the drawings and specifications.

Payment will be made under:

Item L-103-5.1 Temporary Sign Modification – Signage Work – per each lump sum
Item L-103-5.2 Temporary Circuiting – Cable Installation – per linear foot lump sum
Item L-103-5.23 Temporary Lighting and Sign Work – per lump sum

APPLICABLE FAA SPECIFICATIONS

AC 150/5345-7 Specification for L-824 Underground Electrical Cables for airport Lighting Circuits
AC 150/5345-26 Specification for L-823 Plug and Receptacle, Cable Connectors (including Changes 1 & 2)
AC 150/5340-23 Supplemental Wind Cone Assemblies
AC 150/5345-27 Specification for Wind Cone Assemblies
AC 150/5340-28 Low Visibility Taxiway Lighting Systems
AC 150/5345-42 Specification for Airport Light Bases, Transformer Housings, Junction Boxes and Accessories (including Change 1)
AC 150/5345-46 Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47 Isolation Transformers for Airport Lighting Systems
AC 150/5345-53 Airport Lighting Equipment Certification Program
AC 150/5345-42 Specification for Light Base and Transformer Housing, Junction Boxes and Accessories (Including Change 1).
AC 150/5345-53 Airport Lighting Equipment Certification Program.

END OF ITEM L-103
ITEM L-112 DIRECTIONAL DRILL

DESCRIPTION

112-1.1 GENERAL. This item shall consist of furnishing and installing underground raceways using the method of installation commonly referred to as directional drill / directional boring (DD) or jack and bore. This item shall include all services, equipment, materials, tracking and tracing, connection to structure and adjacent raceway and labor for the complete and proper installation, testing and restoration of disturbed ground. A #4 AWG copper counterpoise shall be installed with and external to airfield directional drill duct. Quantity of counterpoise shall be per the details. The counterpoise shall be incidental to the directional drill and shall not be paid separately.

112-1.2 WORK PLAN. Prior to beginning work, the Contractor must submit to the Owner Representative a comprehensive work plan outlining the procedure, duct configuration of each drilling bundle, logistics plan and schedule to be used to execute each drilling location. Prior to the initiation of any installation this work plan must be submitted and accepted by the Owner. The work plan shall define the procedures for accomplishing the directional boring, duct configurations, depths, routes and locating of existing underground utilities and cables of any type, protection of all existing utilities and cables and procedures for connection to electrical structure and base cans at various locations along the directional drill. The Contractor shall also provide documentation of the intended depth of the directional drill along its entire length, and the method used for horizontal vertical control of the directional drilling.

112-1.3 EQUIPMENT. The Contractor shall submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project.

112-1.4 CONTRACTOR QUALITY CONTROL. General requirements for the Contractor's Quality Control Program are outlined in other sections of the specifications.

The following describes the minimum inspection and testing required in the Contractor’s Quality Control Program for the work of this section. THE IMPLEMENTATION OF A CONTRACTOR QUALITY CONTROL PROGRAM DOES NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY TO PROVIDE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, APPLICABLE CODES, REGULATIONS, AND GOVERNING AUTHORITIES. The Contractor Quality Control Program shall include, but not be limited to, the elements included herein. These elements are provided only as a minimum starting point for the Contractor to use to generate the complete Contractor's Quality Control Program.

112-1.5 FIELD QUALITY CONTROL. Maintain a positive grade toward the outlet end with no ponding pocket.
112-1.6 SUBMITTALS. Shop drawings of each airfield lighting component, indicating FAA approval, shall be submitted to the Engineer for review and approval and be approved prior to ordering any materials for this item. This submittal shall include the proposed method of installation for all airfield lighting components. The submittal shall include data on all component parts of the item or system, and shall include the manufacturers list of recommended spare parts for one years use. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the contract documents. The Contractor's submittals shall be in accordance with Item L-106, Submittals, Record Documents and Maintenance Manuals.

EQUIPMENT AND CONSTRUCTION

112-2.1 GENERAL. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe, a drilling fluid mixing and delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of the project.

112-2.2 GUIDANCE & TRACKING SYSTEM. The guidance tracking systems shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system. Directional drilling operations shall not take place unless the Contractor is actively scanning and tracking the bore. The Contractor shall track both lateral location and bore head depth throughout the entire length of the bore. The operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system. The Contractor shall maintain record documents for each bore indicating the depth of the run on 25’ intervals and at any significant change in depth or direction.

112-2.3 DIRECTIONAL CONDUIT. The conduit shall be HDPE SDR 11 Schedule 80 PVC conduit in accordance with Item L-110, Underground Electrical Duct Banks and Conduits. The Contractor is responsible for the selection of pulling hardware, couplings, connectors, fittings and terminations in the electrical structures. All material shall comply with manufacturer recommendations and shall be compatible with the proposed directional drill method and equipment used during the installation.

112-2.4 CASING PIPE. Steel pipe casing shall be manufactured from ductile iron conforming to ASTM A 536 as amended to date, with a minimum yield strength of 35,000 psi. Pipe may be straight seam or spiral welded. A protective coat will not be required. Standard wall thickness shall be provided.

112-2.5 SPACERS. Spacers shall be ¾ to 1 inch thick HDPE with a minimum tensile strength of 3,500 psi and a minimum elongation of 400%. Spacers shall provide 2 inches of separation between the conduit.

112-2.6 CASING PIPE CONDUIT. The conduit shall be Schedule 80 PVC conduit in accordance with Item L-110, Underground Electrical Duct Banks and Conduits.

112-2.7 CASING PIPE GROUT. Grout shall be in accordance with Item P-153, Controlled Low Strength Material (CLSM).
112-2.8 MATERIAL. Materials proposed for the specific tunnel construction method shall be as specified by the directional driller as described in the approved written procedure and work plan and shall be approved by the Engineer. The material shall include the pipe, conduit, fittings, spacers and any other items which are to be an installed component of the project.

Directional drill equipment and pressurized drilling fluid, must be of adequate strength to withstand all loads imposed during and after construction. Construction loads are those imposed by tunneling equipment and soil loads including influence from Group V aircraft using the runways or taxiways above.

a. Installer Qualifications. Engage an experienced installing subcontractor with at least five (5) years’ experience performing work of a similar nature to assume engineering responsibility and perform work of this Section who has specialized in engineering and constructing tunneling systems similar to those required for this Project and with a record of successful in-service performance.

b. Professional Engineer Qualifications. A professional engineer who is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services for designing excavation support and protection systems that are similar to those indicated for this Project in material, design, and extent.

c. Drilling Fluids.

(1) The Contractor shall use a, high quality bentonite drilling fluid or equivalent to ensure hole stabilization, cuttings transport, bit and electronics cooling and hole lubrication to reduce drag on the drill pipe and the telecommunication conduits. Oil based drilling fluids or fluids containing additives that can contaminate the soil or ground water will not be considered acceptable substitutes. Composition of the fluid must comply with all federal and local environmental regulations.

(2) Contractor is responsible for obtaining, transporting and storing water required for drilling fluids. The airport at its option may secure a water source for the Contractor. Drilling fluids shall be mixed with potable water to ensure no contamination is introduced into the soil during the drilling, reaming or the conduit installation process.

(3) Drilling fluids shall be mixed with potable water to ensure no contamination is introduced into the soil during the drilling, reaming or the conduit installation process.

(4) Design mix for grout shall have a minimum compressive strength of 100 psi attained within 24 hours. Grout shall be fluid enough to allow the duct assemblies to be pulled through the bore and to fill all voids within the bore and between individual ducts and spacers.

(5) Disposal of drilling fluids shall be the responsibility of the Contractor and shall be conducted in compliance with all relative environmental regulations, airport workspace agreements, and permit requirements.
(6) Drilling fluid returns can be collected in the entrance pit, exit pit or spoils recovery pit. The Contractor shall immediately clean up any drilling fluid spills or overflows from these pits.

d. **Subsurface Settlement Indicator.** Subsurface settlement indicator shall be fabricated from 2.5 inch diameter schedule 40 steel pipe sleeve installed to the specified depth with a threaded plug mounted flush at the surface. An inner one-inch diameter extra strong steel pipe with a pipe cap and ¼-inch diameter round head stainless steel bolt shall be inserted in the 2.5 inch pipe in such a manner as to indicate subsidence at the specified depth.

e. **Ducts.** Ducts shall be Schedule 80 PVC conduit in accordance with Item L-110, Underground Electrical Duct Banks and Conduits.

f. **Surface Settlement Markers.** Surface settlement markers within pavement areas shall be chiseled marks in the concrete pavement (2”x2” minimum) and p.k. nails in the asphalt shoulder. Surface settlement markers within non-paved areas shall be wooden hubs.

**112-2.9 EXECUTION.** The Engineer must be notified 72 hours in advance of starting work to allow for the coordination of safety and operations. The directional drill shall not begin until the Engineer is present at the job site and agrees that proper preparations for the operation have been made. The Engineer’s approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract. Repair of any damage to existing pavements, sub grades or existing facilities as a result of boring operations shall be the responsibility of the contractor.

The Contractor shall provide documentation that all underground utilities and cable systems have been located, staked and depths confirmed. No work shall begin until the Engineer is assured that the directional boring operation will not result in any utilities or cable system being cut or damaged. The Contractor shall perform soft dig /potholing of the existing underground utilities and/or cable systems that are in potential conflict with the proposed installations to accurately establish their depths.

In directional drill installations of ductbanks greater than 6-way, the Contractor may elect, for his convenience, to pull multiple bundles in close lateral proximity in lieu of a single bundle consisting of one large pull. As part of the work plan, the Contractor shall designate the proposed duct configurations, depths and bundle separation for each crossing for approval by the Engineer. If the Contractor elects to drill in multiple bundles, the payment shall be made on the total quantity pulled at that crossing, not as multiple crossings of smaller configuration.

**112-2.10 INSTALLER QUALIFICATIONS.** Installing subcontractor shall have at least five (5) years’ experience performing work of a similar nature to assume engineering responsibility and perform work of this Section who has specialized in engineering and constructing tunneling systems similar to those required for this Project and with a record of successful in-service performance.

Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing
engineering services for designing excavation support and protection systems that are similar to those indicated for this Project in material, design, and extent.

a. **Qualification Data.** For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include list of at least three (3) completed projects of similar scope with project names and addresses, names and addresses of architects and Owner, and other information specified.

Submit the following Contractor's drawings in accordance with Division 1 Sections:

1. **Design mixes for concrete and grout.**

2. **Method of Construction:**
   
   (a) The Contractor has the option to select the tunnel method including ground water control he will use.
   
   (b) Submit engineering calculations and written procedure and work plan describing in detail the proposed tunnel method and entire operation. This shall include but not be limited to:

   1) **Drilling Operations.** Number and size of construction crew, hours to be worked, pilot hole drilling procedure, reaming procedure, method of monitoring the drilling head, method of verifying conduit location for as built drawing, and schedule for completing major activities. Contractor shall supply this information including the telecommunication conduit assembly and installation: number and size of construction crew, assembly procedure, joining procedure for conduits, and installation pullback procedure.

   2) **Emergency procedures for blowholes or breakouts of drilling fluids and other types of problems that may be experienced on this project.**

   (c) Emergency stabilization plan indicating proposed actions should excessive settlement occur.

   (d) Detailed subsurface monitoring plan including procedures, materials and shop drawings.

   (e) Installation instructions for duct spacers and ducts including alignment methods, grouting methods and strapping configuration.

   (f) Equipment - Supply full details of the Horizontal Directional Drilling system to be utilized including:
1) Technical specifications and manufacturer of Horizontal Directional Drilling System. Date of manufacture of the Horizontal Directional system.

2) Technical specifications and manufacturer for guidance control system.

(g) Site Plan. Supply a site plan for the following:

1) Sample set-up for proposed entry of drilling rig

2) Sample set-up for proposed exit area including laydown area for conduit.

3) Proposed conduit storage areas.

4) Any other off-site areas that will be utilized.

5) Provide descriptions for all downhole components and ensure all downhole drilling components are appropriate for the work to be performed.

6) Provide drawings of the proposed horizontal and vertical directional drilling installation alignment throughout the alignment for approval by the Engineer.

(h) Daily Logs. Maintain and submit a complete set of project records. Maintain a daily activity log during Horizontal Directional Drilling operations. A copy of the log shall be submitted to the Engineer for record purposes on a daily basis. These documents shall include but not limited to:

1) Start and finish time of each section of drill pipe for pilot hole drilling and reaming.

2) For pilot hole drilling, drill bit location at least every 30 feet along the drill path. Contractor will mark the as-built drawings on a daily basis with drilling progress.

3) General description for each ground condition drilled.

4) Details and perceived reasons for delays greater than one hour other than normal breaks and shift changes.

5) Details of any unusual conditions or events.

6) Provide As-Built Location plan and profile of the finished in conduits along with connections to manholes and/or concrete encased conduit.

b. Submit certified test reports and/or manufacturers data for all materials to be used in tunnel construction before delivery of materials.
112-2.11 **DELIVERY, STORAGE AND HANDLING.** Materials shall be unloaded and handled with equipment of adequate capacity, equipped with slings to protect the materials from damage. Storage of materials on the site shall be in a reasonably level well drained area free from poison oak or ivy and brush. Individual pieces and bundles shall be stored with safe walking space between to allow full view for inspection purposes.

**CONSTRUCTION METHODS**

112-3.1 **GENERAL.** Site soil investigation reports and data obtained for design of the tunnel will be available to the Contractor. Interpretation of this material and making his own investigation and determination of the work site soil conditions prior to bidding is the sole responsibility of the Contractor. Rock and/or water, if encountered, shall not entitle the Contractor to additional compensation.

When water is encountered, provide and maintain a dewatering system of sufficient capacity to remove water on a 24-hour basis keeping excavations free of water until the backfill operation is in progress. Dewatering shall be performed in such a manner that removal of soils particles are held to a minimum.

Methods of dewatering shall be at the option and responsibility of the Contractor. Maintain close observation to detect settlement or displacement of surface facilities due to dewatering. Should settlement or displacement be detected, notify the Engineer immediately and take such action as necessary to maintain safe conditions and prevent damage.

a. **Drilling Liquid Disposal.** Disposal of surplus drilling liquid shall be performed in accordance with Federal, State, and Local regulations. Transport via tanker truck to an approved disposal site. Comply with the City of Dallas requirements.

112-3.2 **SITE CONDITIONS.** Tunnel construction shall be performed so as not to interfere with, interrupt or endanger surface and activity thereon, and minimize subsidence of the surface, structures, and utilities above and in the vicinity of the tunnel. Support the ground continuously in a manner that will prevent loss of ground and keep the perimeters and face of the tunnel, passages and shafts stable. The Contractor shall be responsible for all settlement resulting from tunnel operations and shall repair and restore damaged property to its condition prior to being disturbed to the satisfaction of the Engineer at no cost to the Authority.

Comply with applicable ordinances, codes, statutes, rules and regulations of the State of Pennsylvania, applicable County building codes, and regulations of the Federal Government, OSHA 29 CFR 1926 and criteria of ANSI A10.16-95, “Safety Requirements for Construction of Tunnel Shafts and Caissons”.

112-3.3 **PREPARATION.**

a. **Surface Settlement Markers.** Install surface settlement markers placed as specified or as directed by the Engineer for directional drilling, including jack and bore installations. Tie settlement markers to benchmarks and indices sufficiently remove as not to be affected by the tunnel operations. Take readings and permanently record prior to start of dewatering operations and/or shaft excavation. Make all elevation measurements to the nearest 0.01-foot.
(1) Settlement markers for crossing runway or taxiway shall be located to coincide with subsurface settlement indicators and other locations as directed by the Engineer.

b. **Subsurface Settlement Indicators.** Install groups of subsurface settlement indicators at the centerlines of the north and south tunnels at the depths and tunnel stations specified or as directed by the Engineer once the construction sequence has been determined.

(1) Settlement indicators shall be monitored daily when within 50 feet of the tunnel heading. Indicators shall be monitored every other day when within 100 feet of the tunnel heading. All indicators shall be monitored weekly until such time as all crossings are completed to the satisfaction of the Engineer. Monitoring data shall be turned over to the Engineer within 24 hours data collection.

(2) The following limits shall be in effect:

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<td>2.5 feet</td>
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<td>1.0 inches</td>
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<td>1.5 inches</td>
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</tbody>
</table>

Exceeding these settlement limits at any location shall be cause to immediately stop tunneling operations and initiate emergency remedial action in accordance with the approved Emergency Stabilization Plan. Emergency stabilization actions shall be performed to the satisfaction of the Engineer and at no cost to the Authority.

(3) In the event of excessive settlement, the Contractor may be directed to install additional monitoring points at no cost to the Authority.

(4) Remove subsurface settlement indicators at the conclusion of construction upon approval by the Engineer. Fill indicators that are located in runway or taxiway pavements with grout.

(5) The Contractor shall mobilize all necessary personnel, equipment and materials to construct an entry area for drilling operations and exit area for drilling operations.

(6) Contractor shall provide appropriate supports to maintain safe working conditions; ensure stability of the entry, exit, settlement and containment pits; minimize loosening, deterioration and disturbance of the surrounding ground, sidewalks, landscaped areas and roads.

(7) All personnel requiring access to the runways and taxiways shall undergo safety training program and obtain a valid identification card.

**112-3.4 PIT CONSTRUCTION.**
a. Design, construction, maintenance and removal including any damage attributed to the entrance and exit pit construction are the responsibility of the Contractor and shall be approved by the Engineer prior to any excavation. Tunnel shafts and the ingress and egress to the tunnel shall meet requirements of OSHA.

(1) The boring pit shall be solid sheeted, braced, and shored as necessary to provide a safe operation.

(2) Perform excavation, backfill and grading in accordance with appropriate specification sections.

(3) Jacking pits will not be paid for as a separate pay item. All associated costs for Jacking pits shall be included in the price bid for “Jack & Bore” of the size specified.

112-3.5 TUNNEL EQUIPMENT/DD EQUIPMENT.

a. Drill Size. A directional drill is specified for this project, suitably sized for the specified conduit size, length, and configuration.

(1) Contractor must provide project specific installation load calculations that support the use of the particular drill rig with an adequate margin of safety to perform the installation.

(2) Documented experience in comparable rock, depths, and length of installation and diameter must be supplied along with customer verification of satisfactory performance on comparable projects.

b. Instrumentation.

(1) Contractor shall at times provide and maintain instrumentation that will accurately locate the pilot hole, measure drill string axial and torsional loads, and measure drilling fluid discharge rate and pressure. The Engineer shall have access to these instruments, readings and written output at all times.

(2) The Contractor shall monitor the position of the drill string with either an aboveground locator or “walkover” system. Contractor shall compute the position in the x, y and zaxis relative to the ground surface from downhole survey data at a of 50’ intervals. Deviation between the recorded position of the drill string and the specified position of the drill string shall be documented and immediately brought to the attention of the Engineer.

(3) The Contractor shall provide continuous competent monitoring as is necessary to install the telecommunication conduits along the designated HDD alignment.

112-3.6 TUNNEL OPERATIONS.

a. Control the tunnel face at all times. Utilize target boring technology to monitor and maintain location of cutting head. Maintain 8’ minimum cover below runway pavements.

b. When using liner plates, advance excavation in increments sufficient for the placement of one ring of liners and install liner plates immediately after each increment of excavation. Excavate in such a manner that voids behind the liner plates are held to
minimum. Completely fill such voids with grout followed immediately by grout placed under pressure.

c. Whenever the tunnel operation is suspended, support the tunnel face by positive means and keep dewatering system operating. Have qualified personnel periodically check conditions that might threaten the stability of the tunnel.

d. Maintain 8’ minimum clear separation for separate HDD bores.

e. **Pilot Hole and Back reaming.** A smoothly curved pilot hole shall be drilled along the HDD alignment as proposed by the Contractor as shown on the approved drawings. The directional tolerance of the hole will be as follows:

   1. **Vertical tolerances.** Plus 1.0 foot or minus 1.5 feet from the centerline of the conduits shown on the approved drawings. However, the crown of the conduits shall be installed at a minimum depth of at least 8.0 feet.

   2. **Horizontal tolerances.** Plus or minus 1.5 feet from the centerline of the conduits shown on the approved drawings or agreed upon with the Engineer.

   3. **Horizontal separation from adjacent HDD installed conduits.** 8.0 feet minimum from the centerline of the polyethylene conduits shown on the approved drawings or agreed upon with the Engineer.

   4. **Curve radius.** At no point in the drilled profile shall the radius of curvature be less than 400-feet.

   5. **Entry point location.** Contractor may choose where the pilot hole shall enter the ground as agreed upon with the Engineer.

   6. **Exit Point/Drill Target.** The Contractor may choose where the pilot hole shall exit within the routes as identified on the approved drawings or agreed upon with the Engineer.

   7. When crossing under or over existing utility piping, maintain a minimum of 18 inches clearance between outside of the existing utility and the conduit.

   8. Back ream pilot hole to a minimum diameter of 16-inches in order to accept conduit bundle.

**112-3.7 JACK AND BORE.** Installation of steel pipe casing shall be by the dry bore method at locations shown on the plans. Installation of steel pipe casing shall be in accordance with the applicable regulations of the Texas Department of Transportation (TxDOT) and these specifications.

a. **Line and Grade:** The Contractor shall set the boring rig so that after the casing is complete, and the casing pipe is installed, the invert of the pipe shall conform to grade and alignment as shown on the Contract Drawings. As the casing is installed, Contractor shall check the horizontal and vertical alignment frequently.
b. Boring: Boring and jacking of the casing pipe shall be accomplished by the dry auger boring method without jetting, sluicing, or wet boring. The hole shall be bored and cased through the soil by a cutting head on a continuous auger mounted inside the casing pipe. The boring of the hole and installation of the casing pipe shall be simultaneous. Lengths of the casing pipe shall be fully welded to the preceding section in accordance with AWS recommended procedure. Water jetting will not be permitted for excavation of material ahead of the casing or for the removal of spoil from the casing.

c. Diameter of Hole: Bored installations shall have a bored hole diameter essentially the same as the outside diameter of the casing pipe to be installed.

d. Casing Pipe Length: Lengths of casing pipe shall be as long as practical for site conditions. Joints between sections shall be completely welded in accordance with AWS recommended procedures. Prior to welding joints, the Contractor shall ensure that both ends of the casing sections being welded are square.

e. The Contractor shall plan to use a casing lubricant in the event excessive frictional forces jeopardize the successful completion of the casing installation.

f. Once the jacking procedure has begun, it should be continued without stopping until completed.

g. Installation of the Ductbank Conduit: Each 2-inch conduit shall be spaced a minimum of 2 inches from adjacent conduit.

112-3.8 INSTALLATION OF SPACERS. Use one bore spacer for every 5 feet of duct bank. The casing inner diameter shall be smooth and free from ridges, projections and seams that might impede the rolling of the spacer wheels. Install bore spacers perpendicular to conduits to reduce the tendency of duct bank to rotate (corkscrew). Use “stabilization cables” to further reduce the potential of conduit rotation. The movement of the pipe string and the pulling load on the polyethylene pipe shall be monitored and a weak link device shall be used to ensure that the pipe is not damaged during installation.

The bore spacers shall be held in place relative to the conduit as the grout is pumped into the casing. Additionally, the duct bank must be held in position at both ends to accommodate possible uneven thrust loads that may be generated during the grouting operation. When filling the area between the conduits and casing with grout, take care not to exceed the hydraulic collapse pressure of the conduit.

112-3.9 GROUTING. Grouting shall be required as indicated on plans. Grouting effectiveness shall be measured by grout takes and increasing grout pressures.

The grout pump and injection system shall be of a type that will deliver the grout without surging. The grouting circuit shall contain a return line to allow return of the grout from the nozzle to the supply tanks. The grouting equipment shall be capable of developing a uniform pressure at the grout hole connection sufficient to fill voids without disturbing the tunnel lining, adjacent utilities, structures or pavements.
112-3.10 INSTALLATION OF DUCTS.

a. Install ducts per manufacturer’s instructions, the approved Method of Construction plan, and as shown on the Drawings.

b. Backfill interstitial space between casing and bore with drilling fluid. Measure and record quantity of drilling fluid used to ensure all interstitial space is filled.

c. During conduit installation and pullback operation, the Contractor shall monitor the conduit roller system and use of any other equipment to control damage to the conduits. Contractor shall cease installation operations if damage to the conduits occurs. Damaged conduits should be repaired or replaced immediately. Pulling operations may not resume until the conduit is repaired or replaced.

d. Contractor shall ensure that the conduit is not distorted from a circular cross section. During pullback of the casing, care shall be taken to prevent conduit buckling and bending beyond the manufacturer's recommended bending radius. Contractor shall monitor pulling tensions during the installation process.

e. The HDPE casing may be installed by pulling or a combination of pulling and pushing. At all times the push/pull load applied to the casing shall be continually monitored by calibrated load measuring devices.

f. The Contractor shall attach a pulling head to the front section of the casing being installed. Prior to commencement of pull back operations the pulling head design shall be submitted to the Engineer for approval.

g. During pullback of the HDPE casing the pulling load shall not exceed the safe pull force calculated for the segment to be installed.

112-3.11 DIRECTIONAL DRILLING – ENVIRONMENTAL CLEAN-UP. Waste cuttings and drilling mud shall be dewatered and dried by Contractor to the extent necessary for disposal in offsite landfills.

"Blow holes" or “breakouts" of drilling fluid to the surface must be cleaned up immediately and the surface area washed and returned to original condition. All drilling fluids, spoils and separated material will be disposed of in compliance of local environmental regulations. If the amount of surface returns exceeds that which can be contained and collected using small sumps, drilling operations shall be discontinued until surface return volumes can be brought under control. Equipment and materials for cleanup and contingencies must be provided by the Contractor and stored onsite.

112-3.12 LOCATING WIRE. Contractor shall install a tracer wire along the entire length. Contractor shall install a tracer wire adjacent to the Conduit drawing the horizontal drilling process. Electrical continuity of the tracer wire is essential and, therefore, it should be free of splices. The tracer wire may be attached to the leading end of the Conduit or the pulling head and inserted with the Conduit during the horizontal directional drilling process. The wire shall terminate in a manhole and shall be accessible without entering the manhole. The tracer wire shall be copper clad steel 10 gauge or larger, 45mil high density, high molecular weight, polyethylene (HDPE) insulation.
112-3.13 COUNTERPOISE CABLE. Contractor shall install a counterpoise cable the entire length. Counterpoise gauge shall be #4 for lightning protection. Counterpoise shall be terminated at each end of the directional drilling via a ground rod. For jack and bore installations, a ground rod shall be exothermically welded to each end of the steel casing pipe and the direct earth buried counterpoise shall be bonded at the same location on the casing pipe. The casing pipe shall serve as the counterpoise and no additional counterpoise wire shall be installed at the crossing.

METHOD OF MEASUREMENT

112-4.1 The quantity of directional drill and jack and bore to be paid for shall be the number of linear feet installed, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

112-5.1 Payment shall be made at the contract unit price for each type and size of directional drill, complete and accepted. The price shall be full compensation for furnishing all material and for all preparation assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item. This shall include but is not limited to all excavation, backfill and seeding/sodding, mobilization of equipment, casing and duct material, reinforcement, grout, conduit supports, ground rods, counterpoise and tracer wire.

Payment will be made under:

Item L-112-5.16-Way, 2-Inch, PVC Directional Drill – per linear foot
Item L-112-5.2 4-Way, 2-Inch, PVC Directional Drill – per linear foot

REFERENCE DOCUMENTS

OSHA 29 CFR 1926 Safety and Health Regulations for Construction
ANSI A10.16-95 Safety Requirements for Construction of Tunnel Shafts and Caissons”.

END OF ITEM L-112
ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

This item shall also include installing Owner supplied signs, transformers, mounting assemblies, cable connectors, lamps, and Contractor furnished light bases, base plates, adapter rings, concrete work, and all incidentals and appurtenances necessary to place the systems in operation as completed units to the satisfaction of the RPR. This item will also include the testing of the system to ensure correct operation.

EQUIPMENT AND MATERIALS

125-2.1 GENERAL.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to
reject any or all equipment, materials or procedures, which, in the RPR’s opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. Except, LED fixtures shall be provided with a warranty period of 48 months. The defective materials and/or equipment shall be repaired or replaced, at the Owner’s discretion, with no additional cost to the Owner.

125-2.2 CONDUIT/DUCT. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 CABLE AND COUNTERPOISE. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 TAPE. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 CABLE CONNECTIONS. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 RETROREFLECTIVE MARKERS. Retroreflective markers shall be type L-853 and shall conform to the requirements of AC 150/5345-39.

125-2.7 RUNWAY AND TAXIWAY LIGHTS. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

### Lights

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125-2.8 Runway and Taxiway Signs. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

### Signs

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125-2.9 **Circuit Selector Cabinet.** The circuit selector cabinet shall meet the requirements of AC 150/5345-5, Type L-847, two circuit control, Class indoor, Rating 1, for 6.6 amperes.

125-2.10 **Light Base and Transformer Housings.** Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases for in-pavement fixtures shall be Type L-868, Class 1B, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Light bases for fixtures installed in turf or shoulder areas shall be Type L-867, Class 1B, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

Base can for guidance sign installation shall be type L-867, Class 1B, Size D with ½” galvanized steel coverplate as shown on the Drawings.

125-2.11 **Isolation Transformers.** Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

125-2.12 **RECEIVING, STORAGE AND HANDLING OWNER FURNISHED MATERIALS:** Deliver materials and equipment disassembled only to the extent necessary for reasons of shipping limitations, handling facilities, and to avoid damage during shipment. Store and maintain materials and equipment in new condition. The duration of storage will be from the time the Owner turns them over to the Contractor, which may be as early in construction as Contractors NTP. This shall include the use of heat lamps, suitable coverings, indoor storage, etc. to properly protect the equipment and materials. Any equipment or materials, in the opinion of the Owner or RPR, damaged during construction or storage periods shall be replaced by and at the expense of the Contractor.

**INSTALLATION**

125-3.1 **INSTALLATION.** The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

Correct placement of the lights is of prime importance; to achieve this, careful attention to detail is required. Survey instruments may be used to accurately position all fixtures for their
precise location, elevation, and azimuth. The tolerances required in other FAA Advisory Circulars, this specification, and the plans must not be exceeded. The light beam must be aligned as described in the lighting system manual with a tolerance of ±1 degree. The lighting fixture must be level, and the top of the fixture edge must be between +0 inch and -1/16 inch from the pavement top.

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer’s recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

125-3.5 Activating and Testing of Taxiway N1 Lighting and signing: The activating and testing of Taxiway N1 signing and lighting will include energizing the Taxiway N1 centerline light circuit, replacing panels and energizing taxiway guidance signs and installing elevated taxiway edge lights on existing bases as described on the drawings and below.

Taxiway N1 Centerline Lights: The Contractor is to locate the existing disconnected circuit on the airfield. Prior to energizing the existing circuit, The Contractor is to test the existing centerline light circuit cables according to Specification Section L-108 and confirm with the RPR that the circuit cable is safe to energize. Test the lights according to this specification.

Taxiway N1 guidance signs: The Contractor is to locate the signs and replace the existing panels with Airport supplied panels as described on the drawings. Existing removed panels are to be turned over to the Airport or disposed of at directed by the RPR. Signs are to be tested per this specification and accepted by the RPR prior to being energized. Signs are to be energized at the local switch at each sign location.

Taxiway N1 Edge Lights: Prior to edge light fixture installation the Contractor is to test the existing edge light circuit cables according to Specification Section L-108 and confirm with the RPR that the circuit cable is safe to energize. The Contractor is to remove the existing coverplate and install an owner provided edge light at each location show on the drawings. The edge light fixtures are to be connected to the existing transformers and installed as detailed in the drawings. Test the lights according to this specification.
125-3.6 **Existing Sign Modifications:** Contractor is to locate existing sign and verify sign manufacturer, type and size to provide proper equipment for the revised legend. Existing removed panels are to be turned over to the Airport or disposed of as directed by the RPR. Signs are to be tested per this specification and accepted by the RPR prior to being energized.

**METHOD OF MEASUREMENT**

125-4.1 Airfield lighting units procured shall be measured per each for each type provided, stored, protected, and accepted by the RPR.

125-4.2 The quantity of guidance sign units to be paid for under this item shall be the number of each type installed complete and accepted by the RPR. Each guidance sign unit shall include the installation of an identification plate or tag as detailed in the plans.

125-4.3 Light bases for airfield lighting units shall be measured per each for each type provided, installed, in place, completed and accepted by the RPR. Each airfield lighting base shall include base assembly, alignment, leveling, coverplate, conduit connections, epoxy, grounding, ground rod, and the installation of an identification plate or tag as detailed in the plans.

125-4.4 Reflective markers will be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR. Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. Guidance signs will be measured by the number of each type and size installed as completed units, in place, ready for operation, and accepted by the RPR.

**BASIS OF PAYMENT**

125-5.1 Payment will be made at the Contract unit price for each type of light unit procured. This payment will be full compensation for furnishing all materials and for all preparation, storage means, and for all labor, equipment, tools, incidentals, and appurtenances necessary to maintain these items in new condition in accordance with the drawings and specifications.

125-5.2 Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, reflective marker, installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

<table>
<thead>
<tr>
<th>Item L-125-5.1</th>
<th>Procure L-852C(L) LED Taxiway Centerline Light, Bi-Directional, Green/Green – per each</th>
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<tr>
<td>Item L-125-5.2</td>
<td>Procure L-852C(L) LED Taxiway Centerline Light, Bi-Directional, Yellow/Yellow – per each</td>
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Item L-125-5.3  Procure L-852K(L) LED Taxiway Centerline Light, Bi-Directional, Green/Green – per each
Item L-125-5.4  Procure L-852K(L) LED Taxiway Centerline Light, Bi-Directional, Yellow/Yellow – per each
Item L-125-5.5  Procure L-852T(L) LED Flush Taxiway Edge Light, Blue – per each
Item L-125-5.6  Procure L-861T(L) LED Elevated Taxiway Edge Light, Blue – per each
Item L-125-5.7  Procure L-852T(L) LED Taxiway Centerline Light, Omni Directional, Yellow – per each
Item L-125-5.8  Install In-pavement Light and Base – per each
Item L-125-5.9  Install Elevated Edge Light and Base – per each
Item L-125-5.10 Install In-pavement Light on Existing Base – per each
Item L-125-5.11 Install Elevated Edge Light on Existing Base – per each
Item L-125-5.12 Install Elevated Edge Light and Base in Existing Shoulder – per each
Item L-125-5.13 Base Can – per each
Item L-125-5.14 L-853 Taxiway Retroreflective Edge Marker in Shoulder – per each
Item L-125-5.15 Procure and Install L-858 Guidance Sign, 1 Module – per each
Item L-125-5.16 Procure and Install L-858 Guidance Sign, 2 Module – per each
Item L-125-5.17 Procure and Install L-858 Guidance Sign, 3 Module – per each
Item L-125-5.18 Procure and Install L-858 Guidance Sign, 4 Module – per each
Item L-125-5.19 Procure and Install L-858 Approach Guidance Sign – per each
Item L-125-5.20 Modify Existing L-858 Guidance Sign – per each
Item L-125-5.21 Activating and Testing of Taxiway N1 Lighting and Signing – per lump sum
Item L-125-5.22 Install Coverplate on Existing Light Base – per each
Item L-125-5.23 Procure L-852C(L) LED Taxiway Centerline Light, Bi-Directional, Green/Yellow/Yellow/Green – per each
Item L-125-5.24 Procure L-852K(L) LED Taxiway Centerline Light, Bi-Directional, Green/Yellow/Yellow/Green – per each
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 150/5340-18 Standards for Airport Sign Systems
AC 150/5340-26 Maintenance of Airport Visual Aid Facilities
AC 150/5340-30 Design and Installation Details for Airport Visual Aids
AC 150/5345-5 Circuit Selector Switch
AC 150/5345-7 Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26 Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28 Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39 Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42 Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44 Specification for Runway and Taxiway Signs
AC 150/5345-46 Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47 Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51 Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53 Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67 Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125