mesa·az

CITY OF MESA
MESA, ARIZONA



MESA FALCON FIELD AIRPORT (FFZ)
MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

PROJECT NO. CP0994EAST
FAA AIP NO. 03-04-0023-035-2023
DAVIS BACON WAGES APPLY
ADVERTISEMENT FOR BIDS

NOTICE IS HEREBY GIVEN that sealed bids will be received until Thursday, May 11, 2023, at 1:00 p.m. All sealed bids will be received electronically at EngineeringBids@mesaaz.gov . Bids must be submitted as an unencrypted PDF attachment with a maximum size limit of 20MB. Any bid received after the time specified will be returned without any consideration.

This contract shall be for furnishing all labor, materials, transportation and services for the construction and/or installation of the following work:

Construction of Midfield Crossover Taxiway East and realignment of Taxiways D7 and D8

The Engineer's Estimate range is $2,470,000 to $2,730,000.

For all technical, contract, bid-related, or other questions, please contact Donna Horn at donna.horn@mesaaz.gov.

Contact with City Employees. All firms interested in this project (including the firm's employees, representatives, agents, lobbyists, attorneys, and subconsultants) will refrain, under penalty of disqualification, from direct or indirect contact for the purpose of influencing the selection or creating bias in the selection process with any person who may play a part in the selection process. This policy is intended to create a level playing field for all potential firms, to assure that contract decisions are made in public, and to protect the integrity of the selection process. All contact on this selection process should be addressed to the authorized representative identified above.

Contractors desiring to submit proposals may purchase sets of the Bid Documents from **ARC Document Solutions, LLC,** at https://order.e-arc.com/arcEOC/PWELL_Main.asp?mem=29. Click on "Go" for the Public Planroom to access plans. **NOTE: In order to be placed on the Plan Holders List and to receive notifications and updates regarding this bid (such as addenda) during the bidding period, an order must be placed**. The cost of each Bid Set will be no more than $61, which is non-refundable. **Partial bid packages are not sold.** You can view documents on-line (at no cost), order Bid Sets, and access the Plan Holders List on the website at the address listed above. Please verify print lead time prior to arriving for pick-up. For a list of locations nearest you, go to www.e-arc.com.

One set of the Contract Documents is also available for viewing at the City of Mesa's Engineering Department at 20 East Main Street, Mesa, AZ. Please call 480-644-2251 prior to arriving to ensure that the documents are available for viewing.

In order for the City to consider alternate products in the bidding process, please follow Arizona Revised Statutes §34.104c.

If a pre-bid review of the site has been scheduled, details can be referenced in Project Specific Provision Section #3, titled "Pre-Bid Review of Site."

Work shall be completed within 230 consecutive calendar days, beginning with the day following the starting date specified in the Notice to Proceed.

Bids must be submitted on the Proposal Form provided and be accompanied by the Bid Bond for not less than ten percent (10%) of the total bid, payable to the City of Mesa, Arizona, or a certified or cashier's check. PERSONAL OR INDIVIDUAL SURETY BONDS ARE NOT ACCEPTABLE.

The successful bidder will be required to execute the standard form of contract for construction within ten (10) days after formal award of contract. In addition, the successful bidder must be registered in the City of Mesa Vendor Self-Service (VSS) System (http://mesaaz.gov/business/purchasing/vendor-self-service).

The successful bidder, simultaneously with the execution of the Contract, will be required to furnish a Payment Bond in the amount equal to one hundred percent (100%) of the Contract Price, a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Price, and the most recent ACORD® Certificate of Liability Insurance form with additional insured endorsements.

The right is hereby reserved to accept or reject any or all bids or parts thereto, to waive any informalities in any proposal and reject the bids of any persons who have been delinquent or unfaithful to any contract with the City of Mesa.

BETH HUNING
City Engineer

ATTEST:
Holly Moseley
City Clerk

CONTRACTOR CHECKLIST

Proposal and Bid Schedule
(for Design-Bid-Build Projects)

This checklist is for FAA-funded projects only.

Please be sure to attach the following at the designated times.

1. At Time of Bid:
   - A. Signed Proposal Acknowledgement sheet (see attached)
     - Include signature for Acknowledgement of Addenda, if applicable
   - B. Bid Schedule
   - C. Bid Bond (Sealed Original)
   - D. Non-Collusive Bidding Certification
   - E. Certification of Non-Segregated Facilities
   - F. Equal Opportunity Report Statement
   - G. Assurance of Disadvantaged Business Enterprise Participation
   - H. Certification Regarding Debarment
   - I. Certification Regarding Foregin Countries
   - J. Compliance with Buy American Preference
   - K. Certificate of Insurability
   - L. List of Subcontractors, Suppliers, Service Providers, and Manufacturers

2. Upon Contract Award (**if awarded**):
   - A. Completed and Signed ACORD® Certificate of Liability Insurance form with applicable endorsements per Contract requirements. Refer to Exhibit B, Construction Services Contract.
   - B. Signed and Sealed Form of Performance Bond. Refer to Appendix 5, General Conditions.*
   - C. Signed and Sealed Form of Payment Bond. Refer to Appendix 6, General Conditions.*

3. Upon Contract Completion (**if awarded**):
   - A. Signed and Notarized Contractors Affidavit Regarding Settlement of Claims. Refer to Appendix 4, General Conditions.*
   - B. Asbestos-Free Facility Material Certification

*General Conditions Appendices
http://mesaaz.gov/business/engineering/engineering-contracts

CITY OF MESA
MESA, ARIZONA

PROPOSAL ACKNOWLEDGEMENT

MIDFIELD CROSSOVER TAXIWAYS AND REALIGNMENT OF TAXIWAYS D7 AND D8

CITY OF MESA PROJECT NO. CP0994EAST / FAA A.I.P. 03-04-0023-035-2023

PROPOSAL to the City Engineer of the City of Mesa,
In compliance with the Advertisement for Bids, the undersigned bidder:

Having examined the contract documents, site of work, and being familiar with the conditions to be met, hereby submits the following Proposal for furnishing the material, equipment, labor and everything necessary for the completion of the Work listed and agrees to execute the contract documents and furnish the required bonds and certificates of insurance for the completion of said Work, at the locations and for the prices set forth herein.

Understands that construction of this project shall be in accordance with all applicable Uniform Standard Specifications and Standard Details except as otherwise required by the Project Plans and Project Specific Provisions.

Understands that the Proposal shall be submitted with a Proposal guarantee of cash, certified check, cashier's check, or surety bond for an amount of not less than ten percent (10%) of the amount bid.

Agrees that upon receipt of Notice of Award from the City of Mesa, the undersigned bidder will execute the contract documents with no exceptions.

Work shall be completed within 230 consecutive calendar days, beginning with the day following the start date specified in the Notice to Proceed.

Acknowledges that bid prices submitted include all applicable sales and/or use taxes, and no further compensation will be approved for these items.

The Bidder hereby acknowledges receipt of and agrees that the submitter's Proposal is based on the following Addenda:

CITY OF MESA
MESA, ARIZONA

MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CITY OF MESA PROJECT NO. CP0994EAST
FAA AIP 03-04-0023-035-2023
BID SCHEDULE

ITEM NO.	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL PRICE
Schedule 1 Realignment of Taxiways D7 and D8				
1. GP-50a	Construction Survey and Staking	LUMP SUM	$ LUMP SUM	$
2. GP-100a	Contractor Quality Control Program (CQCP)	LUMP SUM	$ LUMP SUM	$
3. GP-100b	FAA Paving QC/QA Workshop	LUMP SUM	$ LUMP SUM	$
4. GP-102a	AZPDES Permit Compliance and SWPPP	LUMP SUM	$ LUMP SUM	$
5. GP-105a	Mobilization	LUMP SUM	$ LUMP SUM	$
6. GTP-10a	Existing Utility Locates	LUMP SUM	$ LUMP SUM	$
7. GTP-20a	Airfield Traffic Control and Barricades	LUMP SUM	$ LUMP SUM	$
8. P-101a	Sawcut Asphalt Pavement (4")	1,370 LF	$	$
9. P-101b	Sawcut Asphalt Pavement (2")	135 LF	$	$
10. P-101c	Asphalt Pavement Removal (Full Depth, 4")	3,300 SY	$	$
11. P-101d	Asphalt Pavement Shoulder Removal (Full Depth, 2")	3,255 SY	$	$
12. P-101e	Asphalt Pavement Removal (Partial Depth, 2")	800 SY	$	$
13. P-101f	Remove Storm Sewer Pipe	416 LF	$	$
14. P-101g	Remove Inlet/Outlet with Grate	2 EA	$	$
15. P-152a	Unclassified Excavation	4,235 CY	$	$
16. P-152b	Unclassified Excavation for Subgrade (8" depth)	1,395 CY	$	$
17. P-152c	Embankment for Undercut	500 CY	$	$
18. P-208a	Aggregate Base Course (10" Thick)	3,550 SY	$	$

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MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CITY OF MESA PROJECT NO. CP0994EAST
FAA AIP 03-04-0023-035-2023
BID SCHEDULE

ITEM NO.	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL PRICE
19. P-222a	Soil Sterilization	6,270	SY	$	$
20. P-401a	Asphalt Surface Course (3/4", 4" Thick)	3,425	SY	$	$
21. P-401b	Asphalt Surface Course (3/4", 3" Thick)	2,845	SY	$	$
22. P-401c	Asphalt Surface Course (3/4", 2" Thick)	795	SY	$	$
23. P-603a	Emulsified Asphalt Tack Coat	425	GAL	$	$
24. P-620a	Surface Preparation (Obliterations)	855	SF	$	$
25. P-620b	Marking (Temporary)	13,785	SF	$	$
26. P-620c	Marking (Permanent)	13,785	SF	$	$
27. D-701a	23"x14" Class V RCP	575	LF	$	$
28. D-710a	Rip Rap (D50=6", T=2') Underlain w/ Filter Fabric	10	CY	$	$
29. D-751a	Inlet Structure with Grate	4	EA	$	$
30. D-751b	Outlet Structure with Grate	4	EA	$	$
31. T-901a	Seeding with Hydromulch	6	AC	$	$
32. L-108a	Install #8 AWG L-824C, 5000V Wire	5,950	LF	$	$
33. L-108b	Install #6 AWG, Bare Copper Counterpoise Including Ground Rods and Terminations	5,400	LF	$	$
34. L-108c	Install #10 AWG XHHW, 600V Wire	10,000	LF	$	$
35. L-110a	Install 1-2" SCH 40 PVC Conduit (DEB)	3,400	LF	$	$
36. L-110b	Install 1-2" SCH 40 PVC Conduit (CE)	450	LF	$	$
37. L-110c	Install 2-2" SCH 40 PVC Conduit (DEB)	900	LF	$	$

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MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CITY OF MESA PROJECT NO. CP0994EAST
FAA AIP 03-04-0023-035-2023
BID SCHEDULE

ITEM NO.	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL PRICE
38. L-110d	Install 2-2" SCH 40 PVC Conduit (CE)	200	LF	$	$
39. L-110e	Install 4-2" SCH 40 PVC Conduit (CE)	260	LF	$	$
40. L-115a	Remove Junction Box, Complete	8	EA	$	$
41. L-115b	Install L-867E Junction Box, Complete	8	EA	$	$
42. L-125a	Remove Base Mounted Runway/Taxiway Light, Complete	31	EA	$	$
43. L-125b	Remove L-858 Guidance Sign, Complete	6	EA	$	$
44. L-125c	Install L-861T LED Taxiway Edge Light, Complete	36	EA	$	$
45. L-125d	Install L-861 LED Runway Edge Light, Complete	1	EA	$	$
46. L-125e	Install L-858 LED Guidance Sign, Size 1, 2 Module, Complete	1	EA	$	$
47. L-125f	Install L-858 LED Guidance Sign, Size 1, 3 Module, Complete	4	EA	$	$
48. L-125g	Install L-858 LED Guidance Sign, Size 1, 4 Module, Complete	2	EA	$	$
49. L-125h	Install L-804 LED Runway Guard Light, Complete	4	EA	$	$
50. L-125i	Install L-853 Retroreflective Marker, Surface Mounted, Complete	8	EA	$	$
TOTAL BASE BID SCHEDULE 1 (Items 1 through 50)					$

BID ALTERNATES

BID ALTERNATE #1					
Schedule 2 Midfield Crossover Taxiway East					
51. GP-50a	Construction Survey and Staking	LUMP SUM	$	LUMP SUM	$
52. GP-100a	Contractor Quality Control Program (CQCP)	LUMP SUM	$	LUMP SUM	$

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MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CITY OF MESA PROJECT NO. CP0994EAST
FAA AIP 03-04-0023-035-2023
BID SCHEDULE

ITEM NO.	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL PRICE
53. GP-102a	AZPDES Permit Compliance and SWPPP	LUMP SUM		$ LUMP SUM	$
54. GP-105a	Mobilization	LUMP SUM		$ LUMP SUM	$
55. GTP-10a	Existing Utility Locates	LUMP SUM		$ LUMP SUM	$
56. GTP-20a	Airfield Traffic Control and Barricades	LUMP SUM		$ LUMP SUM	$
57. P-101a	Sawcut Asphalt Pavement (4")	230	LF	$	$
58. P-101b	Sawcut Asphalt Pavement (2")	65	LF	$	$
59. P-101d	Asphalt Pavement Shoulder Removal (Full Depth, 2")	440	SY	$	$
60. P-101e	Asphalt Pavement Removal (Partial Depth, 2")	85	SY	$	$
61. P-152a	Unclassified Excavation	1,825	CY	$	$
62. P-152b	Unclassified Excavation for Subgrade (8" depth)	1,300	CY	$	$
63. P-152c	Embankment for Undercut	500	CY	$	$
64. P-208a	Aggregate Base Course (10" Thick)	3,480	SY	$	$
65. P-222a	Soil Sterilization	5,835	SY	$	$
66. P-401a	Asphalt Surface Course (3/4", 4" Thick)	3,325	SY	$	$
67. P-401b	Asphalt Surface Course (3/4", 3" Thick)	2,510	SY	$	$
68. P-401c	Asphalt Surface Course (3/4", 2" Thick)	85	SY	$	$
69. P-603a	Emulsified Asphalt Tack Coat	340	GAL	$	$
70. P-620b	Marking (Temporary)	4,520	SF	$	$
71. P-620c	Marking (Permanent)	4,520	SF	$	$

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MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CITY OF MESA PROJECT NO. CP0994EAST
FAA AIP 03-04-0023-035-2023
BID SCHEDULE

ITEM NO.	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL PRICE
72. D-701a	23"x14" Class V RCP	520	LF	$	$
73. D-710a	Rip Rap (D50=6", T=2') Underlain w/ Filter Fabric	10	CY	$	$
74. D-751a	Inlet Structure with Grate	4	EA	$	$
75. D-751b	Outlet Structure with Grate	4	EA	$	$
76. T-901a	Seeding with Hydromulch	3	AC	$	$
77. L-108a	Install #8 AWG L-824C, 5000V Wire	5,000	LF	$	$
78. L-108b	Install #6 AWG, Bare Copper Counterpoise Including Ground Rods and Terminations	4,000	LF	$	$
79. L-108c	Install #10 AWG XHHW, 600V Wire	2,000	LF	$	$
80. L-110a	Install 1-2" SCH 40 PVC Conduit (DEB)	3,100	LF	$	$
81. L-110b	Install 1-2" SCH 40 PVC Conduit (CE)	300	LF	$	$
82. L-110c	Install 2-2" SCH 40 PVC Conduit (DEB)	325	LF	$	$
83. L-110d	Install 2-2" SCH 40 PVC Conduit (CE)	55	LF	$	$
84. L-110e	Install 4-2" SCH 40 PVC Conduit (CE)	75	LF	$	$
85. L-115b	Install L-867E Junction Box, Complete	3	EA	$	$
86. L-125a	Remove Base Mounted Runway/Taxiway Light, Complete	1	EA	$	$
87. L-125c	Install L-861T LED Taxiway Edge Light, Complete	41	EA	$	$
88. L-125d	Install L-861 LED Runway Edge Light, Complete	1	EA	$	$
89. L-125e	Install L-858 LED Guidance Sign, Size 1, 2 Module, Complete	1	EA	$	$
90. L-125g	Install L-858 LED Guidance Sign, Size 1, 4 Module, Complete	2	EA	$	$

CITY OF MESA
MESA, ARIZONA

MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CITY OF MESA PROJECT NO. CP0994EAST
FAA AIP 03-04-0023-035-2023
BID SCHEDULE

ITEM NO.	DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL PRICE
91. L-125h	Install L-804 LED Runway Guard Light, Complete	4 EA	$	$
92. L-125k	Install L-858 LED Guidance Sign, Size 1, 1 Module, Complete	1 EA	$	$
TOTAL BASE BID SCHEDULE 2 (Items 51 through 92)				$

BID ALTERNATE #2

Schedule 3 Install Airfield Lighting Control and Monitoring System (ALCMS)

93. GP-105a	Mobilization	LUMP SUM	$ LUMP SUM	$
94. L-125j	Install L-890 ALCMS, Complete	1.00 EA	$	$
TOTAL BASE BID SCHEDULE 3 (Item 93 through 94)				$

This signed Proposal is submitted by _____,
a corporation organized under the laws of the State of _____, a partnership consisting of
_____ or individual trading
as: _____; of the City of _____, and is the
holder of Arizona State Contractor's License: Classification _____
No. _____.

Joint venture bid proposals will not be accepted for projects bidding in the amount (for base bid) of less than $5 million dollars.

Contractors are reminded it is a violation of State law to submit a bid if not properly licensed. Bids submitted without designating the Contractor's license classification and number, in the spaces provided above, shall be rejected. Bids submitted by Contractors without the required license shall be rejected.

Contractor acknowledges by signing below that bid prices submitted include all applicable sales and/or use taxes, and no further compensation shall be approved for these items. Per MAG 102.3, payment to the Contractor will be made only for the actual quantities of work performed and accepted or materials furnished in accordance with the contract at the unit bid price in the proposal. If there is a conflict between the unit bid price and the unit price extension for a particular pay item, the unit prices shall govern, per MAG 102.5. Also, per MAG 102.7, a proposal shall be considered irregular and may be rejected if there are unauthorized additions, statements, conditional or alternate bids, or irregularities of any kind.

Respectfully submitted,

_____
Firm

_____
Federal Tax ID Number

_____
Address

_____
City, State and Zip Code

_____
Phone

_____
Fax

_____
By (Signature Required)

_____
Name and Title (Print)

_____
Email Address

NON-COLLUSIVE BIDDING CERTIFICATION

STATE OF _____)
) ss
COUNTY OF _____)

I, _____ of the City of _____,

in the County of _____, and the State of _____, of full age, being

duly sworn according to the law on my oath depose and say that:

I am a _____
(Title, Position, Etc.)

of the firm of _____,

the Bidder making the bid for: MESA-FALCON FIELD AIRPORT (FFZ)
PROJECT NAME: MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8
FAA AIP NO. 03-04-0023-035-2023
CITY PROJECT NO. CP0994EAST

and that I executed said Bid with full authority so to do; that said Bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named Project; and that all statements contained in said Bid and in this affidavit are true and correct, and made with full knowledge that the City of Mesa relies upon the truth of the statements contained in said Bid and in the statements contained in this affidavit in awarding the Contract for the said Project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such Contract upon an agreement of understanding, for commission, percentage, brokerage or contingent fee, except bonafide employees or bonafide established commercial or selling agencies maintained by:

_____
(Signature of Bidder)

_____
(Printed or Typed Name of Bidder)
(Seal if Corporation)

Sworn to before me this _____ day of _____, 20___ in the County of _____,
State of _____.

_____
(Notary Public)

My Commission Expires: _____

CERTIFICATION OF NON-SEGREGATED FACILITIES

As required by 41 CFR 60-1.8

(A certification of Non-Segregated Facilities must be submitted prior to the award of a Federally-Funded construction contract or subcontract (*) exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause).

The federally-assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally-assisted construction contractor certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally-assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex or national origin, because of habit, local custom, or any other reason. The federally-assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause, and that he will retain such certifications in his files.

Certification - The information above is true and complete to the best of my knowledge and belief.

_____

Name and Title of Signed (Please Type)

_____ _____

Signature Date

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

*Shall be submitted with the Bidder's Bid.

BIDDER'S EQUAL OPPORTUNITY REPORT STATEMENT

As required by 41 CFR 60-1.7

The Bidder shall complete the following statement by checking the appropriate blanks:

1. The Bidder has _____ has not _____ participated in any previous contract or subcontract subject to the Equal Opportunity Clause prescribed by Executive Order 11246, as amended.

2. The Bidder has ____ has not ____ submitted all compliance reports in connection with any such contract due under the applicable filing requirements; and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained prior to award of subcontracts.

   If the Bidder has participated in a previous contract subject to the Equal Opportunity Clause and has not submitted compliance reports due under applicable filing requirements, the Bidder shall submit a compliance report on Standard Form 100, "Employee Information Report EEO-1", prior to award of the contract (*).

3. The Bidder has _____ has not _____ developed and has on file at each establishment affirmative action programs pursuant to 41 CFR 60-1.40 and 41 CFR 60-2.

4. The Bidder does _____ does not _____ employ fifty (50) or more employees.

_____ _____

Date Bidder

*Shall be submitted with the Bidder's Bid.

BIDDER'S ASSURANCE OF COMPLIANCE WITH TITLE 49 CFR PART 26
RELATING TO DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION

RACE/ GENDER NEUTRAL LANGUAGE

The requirements of 49 CFR Part 26 apply to this contract. It is the policy of the City of Mesa-Falcon Field Airport (Owner) to practice nondiscrimination based on race, color, sex or national origin in the award or performance of this contract. The Owner encourages participation by all firms qualifying under this solicitation regardless of business size or ownership.

NOTE: The bidder's execution of the signature portion of the Bid Proposal shall also constitute execution of this assurance.

The bidder hereby gives assurance pursuant to the requirements of Title 49 CFR Part 26 that bidder has made a reasonable effort to include participation of Disadvantaged Business Enterprise (DBE) in the contract for which this proposal is submitted, and that bidder, if the contract is awarded to bidder, will have a DBE participation of _____ percent of the amount of this bid. Bidder further gives assurance that bidder will submit the documentation required by said Regulations and Exhibit 'C' of the Construction Services Contract, including the Listing of Disadvantaged Business Enterprises with which the bidder will subcontract if the contract is awarded, and of the steps bidder has taken to obtain DBE participation.

_____ _____

Date Bidder

NOTE: Bidder shall insert in the blank(s) above the percentage for participation that the Bidder intends to utilize for this project.

CERTIFICATION REGARDING DEBARMENT

CERTIFICATION OF BIDDER/OFFEROR REGARDING DEBARMENT

By submitting a bid/proposal under this solicitation, the bidder/offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds $25,000 as a "covered transaction", must verify each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: http://www.sam.gov
2. Collecting a certification statement similar to the Certificate Regarding Debarment and Suspension (Bidder or Offeror), above *(i.e. copies of this form with original signature)*
3. Inserting a clause or condition in the covered transaction with the lower tier contract

If the FAA later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

Date	Signature
Company Name	Title

CERTIFICATION REGARDING FOREIGN COUNTRIES

As required by 49 CFR 30

**Clause must be included in all contracts and subcontracts resulting from projects funded under the Airport Improvement Program (AIP) without modification.

By submission of an offer and/or execution of a contract, the Bidder/Contractor certifies that it:

1) is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);
2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and
3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

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

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR § 30.17, no contract shall be awarded to an Offeror or subcontractor:

1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR; or
2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list; or
3) who incorporates in the public works project any product of a foreign country on such USTR list.

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

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

_____	_____
Date	Contractor

CERTIFICATION OF COMPLIANCE WITH
FAA BUY AMERICAN PREFERENCE - CONSTRUCTION PROJECTS

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

a) Only installing iron, steel and manufactured products produced in the United States;
b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

a) To provide to the Airport Sponsor evidence that documents the source and origin of the iron, steel, and/or manufactured product.
b) To faithfully comply with providing U.S. domestic products.
c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
d) Certify that all construction materials used in the project are manufactured in the U.S.

☐ Bidder or offeror hereby certifies it cannot comply with the 100% Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

a) To submit to the Airport Sponsor within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.
c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver - The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "facility/project." The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
d) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
b) At minimum two comparable equal bids and/or offers;
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date	Signature
Company Name	Title

CERTIFICATE OF INSURABILITY

I hereby certify that as a Bidder for:

MESA-FALCON FIELD AIRPORT (FFZ)
PROJECT NAME: MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8
FAA AIP NO. 03-04-0023-035-2023
CITY PROJECT NO. CP0994EAST

I am fully aware of the Insurance Requirements for the Contractor and that by submitting this Bid Proposal, assure the Owner that I can produce the required minimum insurance coverage should I be selected as the successful bidder.

Should I be selected as the successful bidder and then become unable to produce the insurance coverage prior to the award of the project, I understand that my bid will be rejected and that I will forfeit my bid bond.

By: _____ Date: _____
Signature

FEDERAL-AID CONTRACT PROVISIONS
LIST OF SUBCONTRACTORS, SUPPLIERS, SERVICE PROVIDERS, AND MANUFACTURERS BIDDING ON CITY OF MESA FEDERAL-AID CONTRACTS

This form(s) must be submitted to the City of Mesa Engineering Department by the apparent low bidder with, or within five (5) business days following, the opening of bids. Once received by the City, these forms will be sent to the ADOT Business Engagement and Compliance Office (BECO) for evaluation. You may make copies of this form. List all companies that bid with your firm on this contract (whether DBE or non-DBE).

FAILURE TO SUBMIT THIS INFORMATION FOR CIVIL RIGHTS VERIFICATION SHALL BE CAUSE FOR THE BIDDER TO BE DEEMED NONRESPONSIVE AND THE BID TO BE REJECTED.

Project Name: Mesa-Falcon Field Airport (FFZ) Midfield Crossover Taxiway East and Realignment of Taxiways D7 and D8

Project Nos.: City of Mesa: CP0994EAST
FAA AIP No. 03-04-0023-035-2023

Firm Name:	Contact Information (Address or Phone No.)

CITY OF MESA, ARIZONA

MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAY D7 AND D8

CONSTRUCTION SERVICES CONTRACT

(Design-Bid-Build Projects)

PROJECT NO. CP0994EAST

SAMPLE

Version date: February 28, 2023

mesa·az

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SAMPLE

City of Mesa, Arizona
Engineering Department

CONSTRUCTION SERVICES CONTRACT
PROJECT NO.: CP0994EAST

THIS CONTRACT is made and entered into on the _____ day of _____, 2023, by and between City of Mesa, an Arizona municipal corporation, hereinafter called "City" and the "Contractor" designated below.

City and Contractor agree as follows:

ARTICLE 1 – PARTICIPANTS AND PROJECT

CITY: **City of Mesa**
Project Manager:
Telephone:
E-mail:

CONTRACTOR: **(Name)**
(Address)
Arizona ROC No.:
Federal Tax ID No.:
Contractor Representative:
Telephone:
E-mail:

(Prior to execution of the Contract Contractor must provide to City's Engineering Department its Contractor's License Classification and number and its Federal Tax I.D. number.)

DESIGN PROFESSIONAL: **(Name)**
(Address)
Design Professional Representative:
Telephone:
E-mail:

PROJECT DESCRIPTION: Construction of Midfield Crossover Taxiway East and realignment of Taxiways D7 and D8.

PROJECT LOCATION: Falcon Field Airport, Mesa, Arizona

SAMPLE

ARTICLE 2 – CONTRACT DOCUMENTS

2.1 CONTRACT DOCUMENTS

The Contract between City and Contractor shall consist of the following Contract Documents:

1. This Contract and all of its Exhibits, including Technical Specifications and Plans
2. General Conditions, dated 02/28/2023, and General Conditions Appendices, incorporated by reference.*
3. Project Specific Provisions
4. Project Bid Proposal

* http://mesaaz.gov/business/engineering/engineering-contracts

2.2 DEFINITIONS

The definitions in Section 2 of the General Conditions apply to all the Contract Documents, including this Agreement. Additional definitions or defined terms applicable to all the Contract Documents for this Project, if any, include the following:

None

2.3 PROJECT SPECIFIC PROVISIONS

If there are any additional conditions that apply to this Project, they are set forth in the attached Exhibit D, and are incorporated herein.

2.4 PROJECT PLANS AND SPECIFICATIONS

A detailed list of the Plans and Specifications for this Project are set forth in the attached Exhibit D.

ARTICLE 3 – PRE-CONSTRUCTION SERVICES

Contractor is not providing any Pre-Construction Services to the City in relation to this Project.

ARTICLE 4 – CONSTRUCTION SERVICES

4.1 GENERAL

4.1.1 Contractor agrees that this is a Unit Price Contract. Per MAG 102.3, payment to the Contractor will be made only for the actual quantities of work performed and accepted or materials furnished in accordance with the contract at the unit bid price in the proposal. Contractor agrees at its own cost and expense, to do all Work necessary required to fully, timely and properly complete the construction of the Project in strict accordance with the Contract Documents in a good and workmanlike manner, free and clear of all claims, liens, and charges whatsoever, in the manner and under the conditions specified, within the Contract time.

4.1.2 Contractor shall provide all of the labor and materials, and perform the Work in accordance with Section 4 of the General Conditions. Some, but not all, of the major components of the Construction Services and the corresponding subsections of Section 4 of the General Conditions are set forth below.

4.1.3 At all times relevant to this Contract and performance of the Work, the Contactor shall fully comply with all Laws, Regulations, or Legal Requirements applicable to City, the Project and the Contract, including, without limitation, those set forth on attached Exhibit C.

4.1.4 Contractor shall perform the Work under this Contract using only those firms, team members and individuals designated by Contractor consistent with Contractor's accepted Bid, or otherwise, approved by City pursuant to the General Conditions. No other entities or individuals may be used without the prior written approval of the Project Manager.

SAMPLE

4.1.5 Contractor will comply with all terms and conditions of the General Conditions.

4.1.6 In the event of a conflict between this Contract and the General Conditions or an exhibit hereto or appendix thereto, the terms of this Contract shall control.

4.1.7 **Ownership of Work Product.** Notwithstanding anything to the contrary in this Contract, all Work Product prepared or otherwise created in connection with the performance of this Contract, including the Work, are to be and remain the property of City. For purposes of this provision, "Work Product" shall include all designs, drawings, plans, specifications, ideas, renderings and other information or matter, in whatever form created (e.g., electronic or printed) and in all media now known or hereinafter created. All Work Product shall be considered Work Made for Hire as defined in the United States Copyright Act 17 U.S.C. § 101 (Copyright Act). If for any reason, any such Work is found not to be a Work Made for Hire, Contractor hereby transfers and assigns ownership of the copyright in such Work to City. The rights in this Section are exclusive to City in perpetuity.

4.2 CONTRACTOR'S PRE-CONTRACT AND PRE-WORK DELIVERABLES

4.2.1 The Contractor shall provide the Deliverables in accordance with Section 4.2 of the General Conditions.

4.2.2 Any additional items which Contractor must deliver to City prior to commencing the Work on this Project, if any, include the following:

None

4.3 PRE-CONSTRUCTION CONFERENCE

Contractor shall attend the Pre-Construction Conference in accordance with Section 4.3 of the General Conditions.

4.4 PERFORMANCE OF THE WORK (INCLUDING FIELD MEASUREMENTS, SUBCONTRACTORS, AND SUPPLIERS)

Contractor shall perform the Work in accordance with Section 4.4 of the General Conditions.

4.5 CONTROL OF THE PROJECT SITE

Contractor shall control and maintain the Project Site in accordance with Section 4.5 of the General Conditions.

4.6 PROJECT SAFETY

Contractor shall implement and enforce Project safety in accordance with Section 4.6 of the General Conditions.

4.7 MATERIALS QUALITY, SUBSTITUTIONS AND SHOP DRAWINGS

Contractor shall provide materials testing and submit substitute materials and Shop Drawings in accordance with Section 4.7 of the General Conditions.

4.8 PROJECT RECORD DOCUMENTS

Contractor shall maintain and make available the Project Record Documents in accordance with Section 4.8 of the General Conditions.

4.9 WARRANTY AND CORRECTION OF DEFECTIVE WORK

Contractor shall provide warranties and correct defective Work in accordance with Section 4.9 of the General Conditions.

SAMPLE

ARTICLE 5 – CITY RESPONSIBILITIES

5.1 City shall have the responsibilities, and provide the information specified in, and subject to the conditions set forth in, Section 5 of the General Conditions.

5.2 Additional services to be provided or responsibilities assumed, by City, if any, are listed below:

None

5.3 Additional information to be provided by City, if any, is listed below:

None

ARTICLE 6 – CONTRACT TIME

Contract Duration is **230 Calendar Days**.

6.1 CONTRACT TIME

6.1.1 The Contract Time shall start with the Notice to Proceed (NTP) and end with Final Acceptance, as set forth in Article 6.4 below. The Notice to Proceed cannot be issued until approval and acceptance by City of the Bid.

6.1.2 The Contract Time shall be as set forth in the Project Schedule. Contractor agrees that it will commence performance of the Work and complete the Project through Final Acceptance within the Contract Time.

6.1.3 Time is of the essence of this Contract for the Project, and for each phase and/or designated Milestone thereof.

6.1.4 Failure on the part of Contractor to adhere to the approved Project Schedule will be deemed a material breach and sufficient grounds for termination of this Contract by City.

6.2 PROJECT SCHEDULE

The Project Schedule, attached hereto as part of Exhibit A, shall be updated and maintained throughout Contractor's performance under this Contract in accordance with Section 6.2 of the General Conditions.

6.3 SUBSTANTIAL COMPLETION

☐ APPLIES

☒ DOES NOT APPLY

Substantial Completion shall be achieved no later than the Substantial Completion Date set forth in the Project Schedule. Substantial Completion shall be determined in accordance with Section 6.3 of the General Conditions.

6.4 FINAL ACCEPTANCE

6.4.1 Final Acceptance will be obtained within the time period set forth in the Project Schedule.

6.4.2 Final Acceptance will be issued pursuant to Section 6.4 of the General Conditions.

6.4.3 Revise General Condition 6.4.2 to read "The City will allow Partial Acceptance on this project.

SAMPLE

6.5 LIQUIDATED DAMAGES

6.5.1 **Substantial Completion Liquidated Damages.** Contractor acknowledges and agrees that if Contractor fails to achieve Substantial Completion of the Work in accordance with General Conditions Section 6.3, City will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain. Therefore, City and Contractor agree that if Contractor fails to achieve Substantial Completion of the Work within the Contract Time, City shall be entitled to retain or recover from Contractor, as liquidated damages and not as a penalty, the following per diem amounts commencing from the Substantial Completion Date required under the Contract until the actual date of Substantial Completion:

See below

6.5.2 **Final Acceptance Liquidated Damages.** For the same reasons set forth in Article 6.5.1 above, City and Contractor further agree that if Contractor fails to achieve Final Acceptance of the Work within the Contract Time, City shall be entitled to retain or recover from Contractor, as liquidated damages and not as a penalty, the following per diem amounts commencing from the actual date of Substantial Completion or Final Acceptance as required under the Contract.

6.5.3 **MAG Liquidated Damages.** If no liquidated damages are specified in Articles 6.5.1 and/or 6.5.2 above, then the liquidated damages provisions in MAG § 108.9 shall apply.

6.5.4 City may deduct liquidated damages described in this Article 6.5 above from any unpaid amounts then or thereafter due Contractor under this Agreement. Any liquidated damages not so deducted from any unpaid amounts due Contractor shall be payable to City at the demand of City, together with interest from the date of the demand at the highest lawful rate of interest payable by Contractor.

6.6 MUTUAL WAIVER OF CONSEQUENTIAL DAMAGES ONLY

6.6.1 Contractor and City waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes.

1. Damages incurred by City for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

2. Damages incurred by Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

6.6.2 This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination of this Contract. Nothing contained in this Article 6.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with Article 6.5 above.

6.6.3 Nothing herein shall be deemed to constitute a waiver of any other remedy available to City in the event of Contractor's default under this Contract prior to full performance of the Work including, as applicable, specific performance or completion of the Work on behalf of Contractor, the cost and expense of which shall be offset against any monies then or thereafter due to Contractor (if any) and otherwise immediately reimbursed to City by Contractor.

ARTICLE 7 – CONTRACT PRICE

SAMPLE

7.1 CONTRACT PRICE

7.1.1 In exchange for Contractor's full, timely, and acceptable performances and construction of the Work under this Contract, and subject to all of the terms of this Contract, City will pay Contractor the "Contract Price," which is **$_____**.

7.1.2 The Contract Price is all-inclusive and specifically includes all fees, cost, insurance and bond premiums, and taxes of any type necessary to fully, properly and timely perform and construct Work.

7.2 COSTS

For any portion of the Work which, either through this Contract, Change Order or otherwise, is performed and paid for on a cost, or time and materials basis, the costs which may be reimbursed to Contractor and/or chargeable against the Contract Price shall be determined as set forth in Section 7.3 of the General Conditions.

ARTICLE 8 – PAYMENT

Payments shall be made to Contractor in accordance with Section 8 of the General Conditions.

ARTICLE 9 – CHANGES TO THE CONTRACT

Changes to the Contract may be made in strict accordance with Section 9 of the General Conditions.

ARTICLE 10 – SUSPENSION AND TERMINATION

This Contract may be suspended and/or terminated in accordance with Section 10 of the General Conditions.

ARTICLE 11 – INSURANCE AND BONDS

11.1 Contractor shall provide insurance as provided on the attached Exhibit B, and in accordance with Section 11.1 of the General Conditions. Contractor shall provide proof of such insurance and all required endorsements in forms acceptable to City prior to commencing any Work under this Contract.

11.2 Contractor shall provide performance and payment bonds to City in Accordance with Section 11.2 of the General Conditions and A.R.S. § 34-610(A).

11.3 Failure to provide proof of insurance and the required endorsements, or the required bonds, in forms acceptable to City, will be a material breach and grounds for termination for cause of this Contract.

ARTICLE 12 – INDEMNIFICATION

Contractor shall have and assume the indemnity obligations set forth in Section 12 of the General Conditions.

ARTICLE 13 – DISPUTE RESOLUTION

Any claims or disputes relating to this Contract shall be resolved according to the dispute resolution process set forth in Section 13 of, and Appendix 8 to, the General Conditions.

SAMPLE

ARTICLE 14 – MISCELLANEOUS PROVISIONS

The miscellaneous provisions set forth in Section 14 of the General Conditions shall apply to this Contract.

IN WITNESS WHEREOF, the parties hereto have executed this Contract through their duly authorized representatives and bind their respective entitles as of the effective date.

"CITY"
CITY OF MESA

Signature _____

Name _____

Title _____

ATTEST:

Signature _____

Name _____

Title _____

"CONTRACTOR"
COMPANY NAME

Signature _____

Name _____

Title _____

STATE OF ARIZONA)
) ss.
County of Maricopa)

SUBSCRIBED AND SWORN TO before me, the undersigned notary public, by _____, who was identified as the _____ of _____, on this _____ day of _____, 20___.

_____
Notary Public

My commission expires:

_____

SAMPLE

SAMPLE

EXHIBIT A – SCOPE OF WORK AND PROJECT SCHEDULE

(1 PAGE)

All terms and conditions are set forth in the Contract. Any terms and conditions and/or exceptions noted in the Contractor's proposal, GMP, or other documents do not apply unless agreed to in this Contract or an approved addendum.

Section A.1 – Scope of Work:
Contractor shall perform all work in accordance with the plans and requirements identified in Exhibit D.

Section A.2 – Project Schedule:
In accordance with General Conditions, Section 6.

SAMPLE

EXHIBIT B – INSURANCE REQUIREMENTS

(4 PAGES, INCLUDING THIS PAGE)
MINIMUM INSURANCE REQUIREMENTS

Some of the following requirements apply to only design professionals and some apply only to contractors. Requirements will be enforced based on the type of contract.

Contractor/Design Professional shall obtain and submit to City before any Work is performed, certificates from the Contractor's/Design Professional's insurance carriers indicating the presence of coverages and limits of liability as follows.

The City only accepts the most recent version of ACORD® Certificate of Liability Insurance form with additional insured endorsements. The Builder's Risk policy (if required) and the Owners and Contractors Protective Liability (OCP) policy shall remain in effect during construction through the date of project Final Acceptance. The remainder of the insurance policies shall remain in effect during construction and through the one-year warranty period that follows project Final Acceptance, unless otherwise specified in contract documents. Proof of all required coverage(s) shall be provided by the Contractor/Design Professional.

Policy forms must include:

A. Premises and Operations coverage with no explosion, collapse or underground damage (XCU) exclusions;
B. Products and Completed Operations coverage. Contractor/Design Professional agrees to maintain this coverage for a minimum of 10 years following completion of the Contractor/Design Professional Work and to continue to name City as an Additional Insured for the entire 10-year period;
C. Blanket contractual coverage for the indemnity/hold harmless agreements assumed in this Subcontract and in the Prime Contract. Any Employee Exclusion will be deleted;
D. Broad Form Property Damage coverage, including completed operations or its equivalent;
E. An endorsement in a form acceptable to the City, naming City, any other party required to be named as an additional insured under the Contract Documents, and any other parties in interest as Additional Insured(s) under the coverage specified under Comprehensive General Liability or Commercial General Liability. Any form that does not grant additional insured status for both the ongoing operations and products/completed operations coverages IS NOT ACCEPTABLE;
F. An endorsement in a form acceptable to the City, stating: "Such coverage as is afforded by this policy for the benefit of the additional insured(s) is primary and except for any builder's risk property insurance coverage that may be purchased and maintained by City in connection with the Project, any other coverage maintained by such additional insured(s) shall be non-contributing with the coverage provided under this policy;"
G. Coverage SHALL BE on an "Occurrence" form. **"Claims Made"** and **"Modified Occurrence"** forms are not acceptable;
H. Coverage to include general aggregate limits on a "per project" basis;

1. Workers' Compensation (required for both Contractors/Design Professionals):

Coverage A. Statutory Benefits	
Coverage B. Employer's Liability	
Bodily Injury by accident	$1,000,000 each accident
Bodily Injury by disease	$1,000,000 policy limit
Bodily Injury by disease	$1,000,000 each employee

SAMPLE

2. Commercial Auto Coverage (required for both Contractors and Design Professionals):

Auto Liability limits of not less than $1,000,000 Combined Single Limit (Each Accident), combined Bodily Injury and Property Damage Liability insurance. Certificate to reflect coverage for "Any Auto, All Owned, Scheduled, Hired, or Non-Owned."

If the Contract Documents require Contractor/Design Professional to remove and haul hazardous waste from the Project site, or if the Project involves such similar environmental exposure, pollution liability coverage equivalent to that provided under the ISO Pollution Liability-Broadened Coverage for Covered Autos Endorsement shall be provided, and the Motor Carrier Act Endorsement (MCS 90) shall be attached.

3. Commercial General Liability (required for both Contractors/Design Professionals):

Each Occurrence Limit	$1,000,000
Personal Injury/Advertising Injury Limit	$1,000,000
Products/Completed Operations Aggregate Limit	$1,000,000
General Aggregate Limit (other than Products/Completed Operations)	$2,000,000

4. Excess Liability:

Umbrella or Excess Liability may be used to satisfy the above Auto and General Liability coverage requirements and limits to reach a total combined limit of:

Auto	Amount sufficient to cover difference in limits when compared to minimum coverage required.
Each Occurrence	Amount sufficient to cover difference in limits when compared to minimum coverage required.
Aggregate	Amount sufficient to cover difference in limits when compared to minimum coverage required.

5. Professional Liability (required for Design Professionals only):

(Applicable only to Design Professional services which are part of Work.)

Coverage provided must have no exclusion for design-build projects. Contractor/Design Professional must provide evidence of coverage for three (3) years beyond completion of the Project.

Coverage Amount: $1,000,000 per claim/$2,000,000 aggregate, unless higher coverage limits are required under the Contract Documents, in which case such higher limits shall apply.

6. Pollution Legal Liability: $1,000,000 per Occurrence
$1,000,000 Aggregate Limit

(Applicable to any pollutants or hazardous waste exposures as part of Work, except for CMAR Pre-Construction services work.)

Contractor shall maintain insurance covering losses caused by pollution conditions (including mold) that arise from the Work.

SAMPLE

7. Builders Risk (if required, will be required for Contractors only):

Contractor shall include in its Cost Proposal the cost to obtain builders risk or "all risk" or equivalent policy form coverage in the amount of the initial Contract Price. This required insurance coverage is required on projects that are typically outside the public rights-of-way whereby the City is constructing or modifying a public building. The City may, at the City's sole option, purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builders risk "all-risk" or equivalent policy form in the amount of the initial Contract Price, plus value of subsequent contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis. This insurance shall include interests of the City, Contractor and its subcontractors in the Project, and shall include, without limitation, insurance against the perils of fire and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal, including demolition occasioned by enforcement of any applicable legal requirements. City shall bear the responsibility for the deductible for such coverage when a loss affects the Work, provided, however, to the extent such loss is attributable to the negligent or wrongful acts or omissions of Contractor or someone for whom Contractor is responsible, Contractor shall bear the responsibility of the deductible. Such property insurance will not cover any tools or equipment owned or rented by Contractor that will not be incorporated into the Project, including trailers, excavators, scaffoldings, or forms. Contractor is responsible for providing insurance coverage for such items.

8. Owners and Contractors Liability Policy (OCP) (required for Contractors only):

Owners and Contractors Liability Policy: Prior to the execution of the Contract the Contractor shall provide a separate policy of insurance in the amount of $2,000,000, per occurrence, at its sole cost and expense, naming the City of Mesa, a Municipal Corporation and all its agents, representatives, officers, directors, officials and employees as the insured. The Policy shall be primary and not contributory to any insurance maintained by the City of Mesa and shall remain in effect through date of Final Acceptance.

9. Other Requirements:

A. All policies must be written by insurance companies whose rating, in the most recent AM Best's Rating Guide, is not less than A-. All coverage forms must be acceptable to City.

B. ACORD® Certificate of Liability Insurance form with the required endorsements evidencing the required coverages must be PROVIDED to the City prior to commencement of any Work. Failure of City to demand such certificate or other evidence of full compliance with these insurance requirements or failure of City to identify a deficiency from evidence that is provided shall not be construed as a waiver of Contractor's/Design Professional's obligation to maintain such insurance. City shall have the right, but not the obligation, to prohibit Contractor/Design Professional or any of its subcontractors from entering the Project site until such certificates or other evidence that insurance has been placed in complete compliance with these requirements is received and approved by City.

C. The policies shall provide waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay for the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.
The following policies shall include Waiver of Subrogation endorsements:

SAMPLE

Workers' Compensation
Commercial Auto Coverage
Commercial General Liability
Pollution Legal Liability

D. The following policies shall include Additional Insured endorsements:
Commercial Auto Coverage
Commercial General Liability
Excess Liability
Builders Risk

E. Contractor/Design Professional shall be responsible for satisfying any deductible or self-insured retention with respect to any of the coverages required by the Contract Documents to be provided by Contractor/Design Professional.

F. City reserves the right, in its sole discretion, to require higher limits of liability coverage if, in City's opinion, operations by or on behalf of Contractor/Design Professional create higher than normal hazards and, to require Contractor/Design Professional to name additional parties in interest to be Additional Insureds.

G. In the event that rental of equipment is undertaken by Contractor/Design Professional or any Subcontractor to complete and/or perform the Work, Contractor/Design Professional agrees that it shall be solely responsible for such rental equipment. Such responsibility shall include, but not be limited to protection against theft, fire, vandalism and use by unauthorized persons.

H. In the event that materials or any other type of personal property ("personal property") is acquired for the Project or delivered to the Project site, Contractor/Design Professional agrees that it shall be solely responsible for such property until it becomes a fixture on the Project, or otherwise is installed and incorporated as a final part of the Project. Such responsibility shall include, but not be limited to protection against theft, fire, vandalism and use by unauthorized persons.

I. If City elects to utilize an Owner Controlled Insurance Program ("OCIP") which provides coverage for the Work, the Contractor/Design Professional shall comply with all provisions of any such OCIP.

J. Any additional provisions specific to the Project are attached. In the event of any conflict between the attached terms and the terms of this Exhibit, Contractor/Design Professional shall comply with the more stringent provisions.

If a policy does expire, a renewal certificate of the required coverage shall be sent to the City of Mesa not less than five (5) days prior to the expiration date or, if a policy is to be cancelled, changed or not renewed, a proper notice of such action shall be sent to the City not less than ten (10) days prior to any such action by the insurance company.

Notice shall be sent to: City Engineer
City of Mesa
P.O. Box 1466
Mesa, AZ 85211-1466

or

Fax to 480-644-3392
Attention: City Engineer

SAMPLE

mesa·az

EXHIBIT C – COMPLIANCE WITH SPECIFIC GOVERNMENT PROVISIONS

(54 PAGES, INCLUDING THIS PAGE)

1. Federal Aviation Administration (FAA) Required Contract Provisions for Airport Improvement Program (AIP) and for Obligated Sponsors – (45 pages, attached)

2. State of Arizona Requirements
   This project is partially funded with a matching grant from the *State of Arizona: Department of Transportation, Multimodal Planning Division, Aeronautics Group (ADOT)*, combined with local matching funds from the City, and the Contractor shall therefore comply with the following ADOT requirements at all times during performance of its services under this contract:

   A. The Contractor and its subcontractors shall comply at all times with the provisions of Arizona Executive Order 75-5, as amended by Executive Order 2009-09, relating to equal opportunity and nondiscrimination.

   B. The duly authorized representative(s) of the State of Arizona shall have access to any books, documents, papers, and records of the Contractor which are in any way pertinent to this contract for a period of five (5) years following the City's Letter of Acceptance (or payment of Contractor's final invoice), in accordance with A.R.S. 35-214, for the purpose of making inspections, audits, examinations, excerpts and transcripts.

   C. The Contractor certifies that any travel required during performance of the services under this contract, and any subsequent invoices requesting reimbursement of said travel expenses by City, shall be in accordance with the Arizona Revised Statues (A.R.S.) § 38-621 through § 38-627, the State of Arizona Accounting Manual (Section II-D, *Travel Policy*), and the policies and procedures set forth in *ADOT Policy No. FIN-6.02, Travel Authorization Policy*, dated March 1, 2022.

mesa·az

FAA
Airports

Contract Provision Guidelines for Obligated Sponsors and Airport Improvement Program Projects

(Issued on January 20, 2023)

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APPENDIX A – CONTRACT PROVISIONS

A1 ACCESS TO RECORDS AND REPORTS

ACCESS TO RECORDS AND REPORTS

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Owner, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

A2 AFFIRMATIVE ACTION REQUIREMENT

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables

Goals for minority participation for each trade:	10.69%
Goals for female participation in each trade:	6.9%

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's

goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this notice and in the contract resulting from this solicitation, the "covered area" is **Arizona, Maricopa County, City of Mesa.**

A3 BREACH OF CONTRACT TERMS

BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the Contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed with termination of the contract if the Contractor fails to correct the breach by the deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

A4 BUY AMERICAN PREFERENCE

FAA BUY AMERICAN PREFERENCE

The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, BABA and other related Made in America Laws,[1] U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

[1] Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

A4.1.1 Certification of Compliance with FAA Buy American Preference – Construction Projects

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

a) Only installing iron, steel and manufactured products produced in the United States;

b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.

c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or

d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
b) To faithfully comply with providing U.S. domestic products.
c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
d) Certify that all construction materials used in the project are manufactured in the U.S.

☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

a) To the submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.

c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "facility/project." The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
d) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
b) At minimum two comparable equal bids and/or offers;
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date	Signature
Company Name	Title

A4.1.2 Certification of Compliance with FAA Buy American Preference – Equipment/Building Projects

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101, and other Made in America Laws, U.S. statutes, guidance, and FAA policies by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

a) Only installing steel and manufactured products produced in the United States;
b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

a) To provide to the Airport Sponsor or FAA evidence that documents the source and origin of the steel and manufactured product.
b) To faithfully comply with providing U.S. domestic product.
c) To furnish U.S. domestic product for any waiver request that the FAA rejects.
d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.

c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (**Nonavailability)** - The iron, steel, manufactured goods or construction materials are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of the item components and subcomponents produced in the United States is more that 60 percent of the cost of all components and subcomponents of the "item". The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108 (products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
d) Percentage of non-domestic component and subcomponent cost as compared to total "item" component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials, would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire from
b) At minimum two comparable equal bidders and/or offerors;
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date	Signature
Company Name	Title

A5 CIVIL RIGHTS - GENERAL

GENERAL CIVIL RIGHTS PROVISIONS

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

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

A5.1.1 Specific Clause that is used for General Contract Agreements

The above provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract.

A5.1.2 Specific Clause that is used for Lease Agreements or Transfer Agreements

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

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

A6 CIVIL RIGHTS – TITLE VI ASSURANCE

Title VI of the Civil Rights Act of 1964, as amended, (Title VI) prohibits discrimination on the grounds of race, color, or national origin under any program or activity receiving Federal financial assistance. Sponsors must include appropriate clauses from the Standard DOT Title VI Assurances in all contracts and solicitations.

The text of each individual clause comes from the U.S. Department of Transportation Order DOT 1050.2, Standard Title VI Assurances and Nondiscrimination Provisions, effective April 24, 2013. These assurances require that the Recipient (the Sponsor) insert the appropriate clauses in the form provided by the DOT. Where the clause refers to the applicable activity, project, or program, it means the AIP project.

The clauses are as follows:

A6.1.1 Applicability of Title VI Solicitation Notice

Contract Clause	**The Sponsor must include the contract clause in:**	**Clause Text is Included in Paragraph**
Title VI Solicitation Notice – • Assurance 2 of the DOT Standard Title VI Assurances and Nondiscrimination Clauses • Assurance 30(d) of the Airport Sponsors Assurances	1) All AIP funded solicitations for bids, requests for proposals, or any work subject to Title VI regulations; and 2) All Sponsor proposals for negotiated agreements **regardless of funding source.**	A6.3.1
Title VI Clauses for Compliance with Nondiscrimination Requirements • Assurance 3 of the DOT Standard Title VI Assurances and Nondiscrimination Clauses • Assurance 30(e)(1) of the Airport Sponsor Assurances	Every contract or agreement (unless the Sponsor has determined, and the FAA concurs, that the contract or agreement is not subject to the Nondiscrimination Acts and Authorities, which is a rare occurrence). It has been determined that service contracts with utility companies that are not already subject to substantively identical nondiscrimination requirements must include this clause.	A6.2.2

Contract Clause	The Sponsor must include the contract clause in:	Clause Text is Included in Paragraph
Title VI Required Clause for Transfer of Real Property Acquired or Improved Under the Activity, Facility or Program – • Assurance 5 of the DOT Standard Title VI Assurances and Nondiscrimination Clauses • Assurance 30(e)(4)(a) of the Airport Sponsor Assurances	As a covenant running with the land, in any future deeds, leases, licenses, permits, or similar instruments entered into by the Sponsor with other parties for all transfers of real property acquired or improved under Airport Improvement Program This applies to agreements such as leases where a physical portion of the airport is transferred for use, for example a fuel farm, apron space, or a parking facility. It applies to agreements not covered by A6.4.4.	N/A
Clause for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program • Assurance 6 of the DOT Standard Title VI Assurances and Nondiscrimination Clauses • Assurance 30(e)(4)(b) of the Airport Sponsor Assurances	In any future (deeds, leases, licenses, permits, or similar instruments) entered into by the Sponsor with other parties for the construction or use of, or access to, space on, over, or under real property acquired or improved under Airport Improvement Program This applies to agreements such as leases of concession space in a terminal not covered by A6.4.3.	N/A
Title VI List of Pertinent Nondiscrimination Acts and Authorities • Assurance 3 of the DOT Standard Title VI Assurances and Nondiscrimination Clauses • Assurance 30(e)(2) of the Airport Sponsor Assurances	Insert this list in every contract or agreement, unless the Sponsor has determined, and the FAA concurs, that the contract or agreement is not subject to the Nondiscrimination Acts and Authorities, which is a rare occurrence. **This list can only be omitted if the FAA has determined that the contractor or company is already subject to substantively identical nondiscrimination requirements.**	A6.2.1 **List must be included in all applicable contracts.**

A6.1.2 Title VI Solicitation Notice

Title VI Solicitation Notice:

The **City of Mesa,** in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and no businesses will be discriminated against on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in consideration for an award.

A6.2 MANDATORY CONTRACT CLAUSES

A6.2.1 Title VI List of Pertinent Nondiscrimination Acts and Authorities

Insert this list in every contract or agreement, unless the Sponsor has determined and the FAA concurs, that the contract or agreement is not subject to the Nondiscrimination Acts and Authorities. This list can be omitted if the FAA has determined that the contractor or company is already subject to nondiscrimination requirements, which is a rare occurrence.

Title VI List of Pertinent Nondiscrimination Acts and Authorities

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

- Title VI of the Civil Rights Act of 1964 (42 USC § 2000d *et seq*., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973 (29 USC § 794 *et seq*.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);
- The Age Discrimination Act of 1975, as amended (42 USC § 6101 *et seq*.) (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982 (49 USC § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987 (PL 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990 (42 USC § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration's Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations);

- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs [70 Fed. Reg. 74087 (2005)];
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC § 1681, et seq).

A6.2.2 Nondiscrimination Requirements/Title VI Clauses for Compliance

The Sponsor must include this contract clause in:

1) Every contract or agreement (unless the Sponsor has determined, and the FAA concurs, that the contract or agreement is not subject to the Nondiscrimination Acts and Authorities); and

2) Service contracts with utility companies that are not already subject to substantively identical nondiscrimination requirements.

3) Other types of contracts with utility companies involving property covered by A6.4.2, A6.4.3, or A6.4.4.

Compliance with Nondiscrimination Requirements:

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

1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.
3. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the contractor's obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.

4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:
    a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or
    b. Cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

A7 CLEAN AIR AND WATER POLLUTION CONTROL

CLEAN AIR AND WATER POLLUTION CONTROL

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 USC §§ 7401-7671q) and the Federal Water Pollution Control Act as amended (33 USC §§ 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

Contractor must include this requirement in all subcontracts that exceed $150,000.

A8 CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

1. Overtime Requirements.

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of $29 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration (FAA) or the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this clause.

4. Subcontractors.

The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this clause.

A9 COPELAND "ANTI-KICKBACK" ACT

COPELAND "ANTI-KICKBACK" ACT

Contractor must comply with the requirements of the Copeland "Anti-Kickback" Act (18 USC 874 and 40 USC 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled. The Contractor and each Subcontractor must submit to the Owner, a weekly statement on the wages paid to each employee performing on covered work during the prior week. Owner must report any violations of the Act to the Federal Aviation Administration.

A10 DAVIS-BACON REQUIREMENTS

DAVIS-BACON REQUIREMENTS

1. Minimum Wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided,* that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be

classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination;

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers, or mechanics to be employed in the classification, or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided,* that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding. The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage

requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the Contractor, Sponsor, Applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and Basic Records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR § 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (*e.g.,* the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at *http://www.dol.gov/esa/whd/forms/wh347instr.htm* or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration, the

Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5 (a)(3)(i), and that such information is correct and complete;

(2) That each laborer and mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, Sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR § 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of

probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR § 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination that provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training

Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal Employment Opportunity. The utilization of apprentices, trainees, and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act Requirements.

The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

6. Subcontracts.

The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR §§ 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR § 5.5.

7. Contract Termination: Debarment.

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR § 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements.

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes Concerning Labor Standards.

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of Eligibility.

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR § 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR § 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 USC § 1001.

A11 DEBARMENT AND SUSPENSION

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds $25,000 as a "covered transaction", must confirm each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally-assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: http://www.sam.gov.
2. Collecting a certification statement similar to the Certification of Offeror /Bidder Regarding Debarment, above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract.

If the Federal Aviation Administration later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

A12 DISADVANTAGED BUSINESS ENTERPRISE

A12.1.1 Solicitation Language (Solicitations that include a Contract Goal)

Bid Information Submitted as a matter of **responsiveness**:

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR § 26.53.

As a condition of responsiveness, the Bidder or Offeror must submit the following information with its proposal on the forms provided herein:

1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
2) A description of the work that each DBE firm will perform;
3) The dollar amount of the participation of each DBE firm listed under (1);
4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal
5) Written confirmation from each listed DBE firm that it is participating in the contract in the kind and amount of work provided in the prime contractor's commitment; and
6) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

Bid Information submitted as a matter of **responsibility**:

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR § 26.53.

As a condition of responsibility, every Bidder or Offeror must submit the following information on the forms provided herein within five days after bid opening.

1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
2) A description of the work that each DBE firm will perform;
3) The dollar amount of the participation of each DBE firm listed under (1);
4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal;
5) Written confirmation from each listed DBE firm that it is participating in the contract in the kind and amount of work provided in the prime contractor's commitment; and
6) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26. The documentation of good faith efforts must include copies of each DBE and non-DBE

subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

A12.1.2 Solicitation Language (Race/Gender Neutral Means)

The requirements of 49 CFR part 26 apply to this contract. It is the policy of the City of Mesa to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. The Owner encourages participation by all firms qualifying under this solicitation regardless of business size or ownership.

A12.1.3 Prime Contracts (Contracts Covered by a DBE Program)

Contract Assurance (49 CFR § 26.13; mandatory text provided) –

The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

1) Withholding monthly progress payments;
2) Assessing sanctions;
3) Liquidated damages; and/or
4) Disqualifying the Contractor from future bidding as non-responsible.

Prompt Payment (49 CFR § 26.29) –
The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 30 days from the receipt of each payment the prime contractor receives from City of Mesa. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the City of Mesa. This clause applies to both DBE and non-DBE subcontractors.

Termination of DBE Subcontracts (49 CFR § 26.53(f); acceptable/sample text provided) –
The prime contractor must not terminate a DBE subcontractor listed in response to this solicitation without prior written consent of City of Mesa. This includes, but is not limited to, instances in which the prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

The prime contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the contractor obtains written consent City of Mesa. Unless City of Mesa

consent is provided, the prime contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE.

City of Mesa may provide such written consent only if City of Mesa agrees, for reasons stated in the concurrence document, that the prime contractor has good cause to terminate the DBE firm. For purposes of this paragraph, good cause includes the circumstances listed in 49 CFR §26.53.

Before transmitting to City of Mesa its request to terminate and/or substitute a DBE subcontractor, the prime contractor must give notice in writing to the DBE subcontractor, with a copy to City of Mesa, of its intent to request to terminate and/or substitute, and the reason for the request.

The prime contractor must give the DBE five days to respond to the prime contractor's notice and advise City of Mesa and the contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why City of Mesa should not approve the prime contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), City of Mesa may provide a response period shorter than five days.

In addition to post-award terminations, the provisions of this section apply to preaward deletions of or substitutions for DBE firms put forward by offerors in negotiated procurements.

A13 DISTRACTED DRIVING

TEXTING WHEN DRIVING

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving", (10/1/2009) and DOT Order 3902.10, "Text Messaging While Driving", (12/30/2009), the Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or subgrant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding $10,000 that involve driving a motor vehicle in performance of work activities associated with the project.

A14 PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to use and procurement of certain telecommunications and video surveillance services or equipment in compliance with the National Defense Authorization Act [Public Law 115-232 § 889(f)(1)].

A15 EQUAL EMPLOYMENT OPPORTUNITY (EEO)

EQUAL OPPORTUNITY CLAUSE

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identify, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff, or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the Contractor's commitments under this section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in

whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The Contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance*: Provided,* however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

1. As used in these specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

   b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;

   c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

   d. "Minority" includes:

      (1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

      (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);

      (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

      (4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the

provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR part 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are

aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant may be asserted as fulfilling any one or more of its obligations under 7a through 7p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative

action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, sexual orientation, gender identity, or national origin.

11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR part 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

A16 FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, et seq, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

A17 LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

CERTIFICATION REGARDING LOBBYING

The Bidder or Offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

A18 PROHIBITION OF SEGREGATED FACILITIES

PROHIBITION OF SEGREGATED FACILITIES

(a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Employment Opportunity clause in this contract.

(b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

A19 OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (29 CFR Part 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

A20 PROCUREMENT OF RECOVERED MATERIALS

PROCUREMENT OF RECOVERED MATERIALS

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

1) The contract requires procurement of $10,000 or more of a designated item during the fiscal year; or
2) The contractor has procured $10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products.

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
b) Fails to meet reasonable contract performance requirements; or
c) Is only available at an unreasonable price.

A21 TAX DELINQUENCY AND FELONY CONVICTIONS

CERTIFICATION OF OFFEROR/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

The applicant must complete the following two certification statements. The applicant must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark (✓) in the space following the applicable response. The applicant agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications

3) The applicant represents that it is ( ) is not ( ) a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

4) The applicant represents that it is ( ) is not ( ) a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note

If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the Sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made.

Term Definitions

Felony conviction: Felony conviction means a conviction within the preceding twenty four (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. Code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 USC § 3559.

Tax Delinquency: A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

A22 TERMINATION OF CONTRACT

TERMINATION FOR CONVENIENCE (CONSTRUCTION & EQUIPMENT CONTRACTS)

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

1. Contractor must immediately discontinue work as specified in the written notice.
2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.
3. Discontinue orders for materials and services except as directed by the written notice.
4. Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work, and as directed in the written notice.
5. Complete performance of the work not terminated by the notice.
6. Take action as directed by the Owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

1. Completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;
2. Documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
3. Reasonable and substantiated claims, costs, and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
4. Reasonable and substantiated expenses to the Contractor directly attributable to Owner's termination action.

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

TERMINATION FOR CAUSE (CONSTRUCTION)

Section 80-09 of FAA Advisory Circular 150/5370-10 establishes standard language for conditions, rights, and remedies associated with Owner termination of this contract for cause due to default of the Contractor.

TERMINATION FOR CAUSE (EQUIPMENT)

The Owner may, by written notice of default to the Contractor, terminate all or part of this Contract for cause if the Contractor:

1. Fails to begin the Work under the Contract within the time specified in the Notice- to-Proceed;
2. Fails to make adequate progress as to endanger performance of this Contract in accordance with its terms;
3. Fails to make delivery of the equipment within the time specified in the Contract, including any Owner approved extensions;
4. Fails to comply with material provisions of the Contract;
5. Submits certifications made under the Contract and as part of their proposal that include false or fraudulent statements; or
6. Becomes insolvent or declares bankruptcy.

If one or more of the stated events occur, the Owner will give notice in writing to the Contractor and Surety of its intent to terminate the contract for cause. At the Owner's discretion, the notice may allow the Contractor and Surety an opportunity to cure the breach or default.

If within [10] days of the receipt of notice, the Contractor or Surety fails to remedy the breach or default to the satisfaction of the Owner, the Owner has authority to acquire equipment by other procurement action. The Contractor will be liable to the Owner for any excess costs the Owner incurs for acquiring such similar equipment.

Payment for completed equipment delivered to and accepted by the Owner shall be at the Contract price. The Owner may withhold from amounts otherwise due the Contractor for such completed equipment, such sum as the Owner determines to be necessary to protect the Owner against loss because of Contractor default.

Owner will not terminate the Contractor's right to proceed with the work under this clause if the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such acceptable causes include: acts of God, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, and severe weather events that substantially exceed normal conditions for the location.

If, after termination of the Contractor's right to proceed, the Owner determines that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the Owner issued the termination for the convenience the Owner.

The rights and remedies of the Owner in this clause are in addition to any other rights and remedies provided by law or under this contract.

A23 TRADE RESTRICTION CERTIFICATION

TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror –

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

2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and

3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

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

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR § 30.17, no contract shall be awarded to an Offeror or subcontractor:

1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR; or
2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list; or
3) who incorporates in the public works project any product of a foreign country on such USTR list.

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

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

A24 VETERAN'S PREFERENCE

VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 USC § 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

A25 DOMESTIC PREFERENCES FOR PROCUREMENTS

CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR PROCUREMENTS

The Bidder or Offeror certifies by signing and submitting this bid or proposal that, to the greatest extent practicable, the Bidder or Offeror has provided a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including, but not limited to, iron, aluminum, steel, cement, and other manufactured products) in compliance with 2 CFR § 200.322.

Exhibit C.1 Wage Determination

"General Decision Number: AZ20230008 01/06/2023

Superseded General Decision Number: AZ20220008

State: Arizona

Construction Type: Highway

Counties: Coconino, Maricopa, Mohave, Pima, Pinal, Yavapai and Yuma Counties in Arizona.

HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2023

CARP0408-005 07/01/2022

	Rates	Fringes
CARPENTER (Including Cement Form Work)	$ 32.90	13.62

ENGI0428-001 06/01/2022

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Group 1	$ 30.14	12.57
Group 2	$ 33.41	12.57
Group 3	$ 34.49	12.57
Group 4	$ 35.52	12.57

POWER EQUIPMENT OPERATORS CLASSIFICATIONS:

GROUP 1: A-frame boom truck, air compressor, Beltcrete, boring bridge and texture, brakeman, concrete mixer (skip type), conductor, conveyor, cross timing and pipe float, curing machine, dinky (under 20 tons), elevator hoist (Husky and similar), firemen, forklift, generator (all), handler, highline cableway signalman, hydrographic mulcher, joint inserter, jumbo finishing machine, Kolman belt loader, machine conveyor, multiple power concrete saw, pavement breaker, power grizzly, pressure grout machine, pump, self-propelled chip spreading machine, slurry seal machine (Moto paver driver), small self-propelled compactor (with blade-backfill, ditch operation), straw blower, tractor (wheel type), tripper, tugger (single drum), welding machine, winch truck

GROUP 2:
ALL COUNTIES INCLUDING MARICOPA: Aggregate Plant, Asphalt plant Mixer, Bee Gee, Boring Machine, Concrete Pump, Concrete Mechanical Tamping-Spreading Finishing Machine, Concrete Batch Plant, Concrete Mixer (paving & mobile), Elevating Grader (except as otherwise classified), Field Equipment Serviceman, Locomotive Engineer (including Dinky 20 tons & over), Moto-Paver, Oiler-Driver, Operating Engineer Rigger, Power Jumbo Form Setter, Road Oil Mixing Machine, Self-Propelled Compactor (with blade-grade operation), Slip Form (power driven lifting device for concrete forms), Soil Cement Road Mixing Machine, Pipe-Wrapping & Cleaning Machine (stationary or traveling), Surface Heater & Planer, Trenching Machine, Tugger (2 or more drums).

MARICOPA COUNTY ONLY: Backhoe < 1 cu yd, Motor Grader (rough), Scraper (pneumatic tired), Roller (all types asphalt), Screed, Skip Loader (all types 3<6 cu yd), Tractor (dozer, pusher-all).

GROUP 3:
ALL COUNTIES INCLUDING MARICOPA: Auto Grade Machine, Barge, Boring Machine (including Mole, Badger & similar type directional/horizontal), Crane (crawler & pneumatic 15>100 tons), Crawler type Tractor with boom attachment & slope bar, Derrick, Gradall, Heavy Duty Mechanic-Welder, Helicopter Hoist or Pilot, Highline Cableway, Mechanical Hoist, Mucking Machine, Overhead Crane, Pile Driver Engineer (portable, stationary or skid), Power Driven Ditch

Lining or Ditch Trimming Machine, Remote Control Earth Moving Machine, Slip Form Paving Machine (including Gunnert, Zimmerman & similar types), Tower Crane or similar type.

MARICOPA COUNTY ONLY: Backhoe<10 cu yd, Clamshell < 10 cu yd, Concrete Pump (truck mounted with boom only), Dragline <10 cu yd, Grade Checker, Motor Grader (finish-any type power blade), Shovel < 10 cu yd.

GROUP 4: Backhoe 10 cu yd and over, Clamshell 10 cu yd and over, Crane (pneumatic or crawler 100 tons & over), Dragline 10 cu yd and over, Shovel 10 cu yd and over.

All Operators, Oilers, and Motor Crane Drivers on equipment with Booms, except concrete pumping truck booms, including Jibs, shall receive $0.01 per hour per foot over 80 ft in addition to regular rate of pay

Premium pay for performing hazardous waste removal $0.50 per hour over base rate.

IRON0075-004 08/01/2022

COCONINO, MARICOPA, MOHAVE, YAVAPAI & YUMA COUNTIES

	Rates	Fringes
Ironworker, Rebar	$ 28.50	18.16

Zone 1: 0 to 50 miles from City Hall in Phoenix or Tucson
Zone 2: 050 to 100 miles - Add $4.00
Zone 3: 100 to 150 miles - Add $5.00
Zone 4: 150 miles & over - Add $6.50

LABO1184-008 06/01/2021

	Rates	Fringes
Laborers:		
Group 1	$ 21.93	6.27
Group 2	$ 23.57	6.27
Group 3	$ 24.43	6.27
Group 4	$ 25.40	6.27
Group 5	$ 26.50	6.27

LABORERS CLASSIFICATIONS:

GROUP 1: All Counties: Chipper, Rip Rap Stoneman. Pinal County Only: General/Cleanup Laborer. Maricopa County Only: Flagger.

GROUP 2: Asphalt Laborer (Shoveling-excluding Asphalt Raker or Ironer), Bander, Cement Mason Tender, Concrete Mucker, Cutting Torch Operator, Fine Grader, Guinea Chaser, Power Type Concrete Buggy

GROUP 3: Chain Saw, Concrete Small Tools, Concrete Vibrating Machine, Cribber & Shorer (except tunnel), Hydraulic Jacks and similar tools, Operator and Tender of Pneumatic and Electric Tools (not herein separately classified), Pipe Caulker and Back-Up Man-Pipeline, Pipe Wrapper, Pneumatic Gopher, Pre-Cast Manhole Erector, Rigger and Signal

Man-Pipeline

GROUP 4: Air and Water Washout Nozzleman; Bio-Filter, Pressman, Installer, Operator; Scaffold Laborer; Chuck Tender; Concrete Cutting Torch; Gunite; Hand-Guided Trencher; Jackhammer and/or Pavement Breaker; Scaler (using boson's chair or safety belt); Tamper (mechanical all types).

GROUP 5: AC Dumpman, Asbestos Abatement, Asphalt Raker II, Drill Doctor/Air Tool Repairman, Hazardous Waste Removal, Lead Abatement, Lead Pipeman, Process Piping Installer, Scaler (Driller), Pest Technician/Weed Control, Scissor Lift, Hydro Mobile Scaffold Builder.

PAIN0086-001 04/01/2017

	Rates	Fringes
PAINTER		
PAINTER (Yavapai County only), SAND BLASTER/WATER BLASTER (all Counties)	$ 19.58	6.40

ZONE PAY: More than 100 miles from Old Phoenix Courthouse $3.50 additional per hour.

SUAZ2009-001 04/20/2009

	Rates	Fringes
CEMENT MASON	$ 19.28	3.99
ELECTRICIAN	$ 22.84	6.48
IRONWORKER (Rebar)		
Pima County	$ 23.17	14.83
Pinal County	$ 20.27	8.35
LABORER		
Asphalt Raker	$ 15.49 **	3.49
Compaction Tool Operator	$ 14.59 **	2.91
Concrete Worker	$ 13.55 **	3.20
Concrete/Asphalt Saw	$ 13.95 **	2.58
Driller-Core, diamond, wagon, air track	$ 16.94	3.12
Dumpman Spotter	$ 14.99 **	3.16
Fence Builder	$ 13.28 **	2.99
Flagger Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 12.35 **	1.59
Formsetter	$ 16.09 **	3.97
General/Cleanup Laborer Coconino, Maricopa, Mohave, Pima, Yavapai & Yuma	$ 14.54 **	3.49
Grade Setter (Pipeline)	$ 17.83	5.45
Guard Rail Installer	$ 13.28 **	2.99
Landscape Laborer	$ 11.39 **	
Landscape Sprinkler Installer	$ 15.27 **	
Pipelayer	$ 14.81 **	2.96
Powderman, Hydrasonic	$ 16.39	2.58

OPERATOR: Power Equipment

Asphalt Laydown Machine	$ 21.19	6.05
Backhoe < 1 cu yd Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 17.37	3.85
Backhoe < 10 cu yd Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 18.72	3.59
Clamshell < 10 cu yd Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 18.72	3.59
Concrete Pump (Truck Mounted with boom only) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 19.92	7.10
Crane (under 15 tons)	$ 21.35	7.36
Dragline (up to 10 cu yd) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 18.72	3.59
Drilling Machine (including Water Wells)	$ 20.58	5.65
Grade Checker Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 16.04 **	3.68
Hydrographic Seeder	$ 15.88 **	7.67
Mass Excavator	$ 20.97	4.28
Milling Machine/Rotomill	$ 21.42	7.45
Motor Grader (Finish-any type power blade) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 21.92	4.66
Motor Grader (Rough) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 20.07	4.13
Oiler	$ 18.15	8.24
Power Sweeper	$ 16.76	4.44
Roller (all types Asphalt) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 18.27	3.99
Roller (excluding asphalt)	$ 15.65 **	3.32
Scraper (pneumatic tired) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 17.69	3.45
Screed Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 17.54	3.72
Shovel < 10 cu yd Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 18.72	3.59
Skip Loader (all types <3 cu yd)	$ 18.28	5.30
Skip Loader (all types 3 < 6 cu yd) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 18.64	4.86
Skip Loader (all types 6 < 10 cu yd)	$ 20.15	4.52
Tractor (dozer, pusher - all) Coconino, Mohave, Pima, Pinal, Yavapai & Yuma	$ 17.26	2.65

PAINTER

Coconino, Maricopa,		

Mohave, Pima, Pinal & Yuma	$ 15.57 **	3.92
TRUCK DRIVER		
2 or 3 Axle Dump or Flatrack	$ 16.27	3.30
5 Axle Dump or Flatrack	$ 13.97 **	2.89
6 Axle Dump or Flatrack (< 16 cu yd)	$ 17.79	6.42
Belly Dump	$ 14.67 **	
Oil Tanker Bootman	$ 22.03	
Self-Propelled Street Sweeper	$ 13.11 **	5.48
Water Truck 2500 < 3900 gallons	$ 18.14	4.55
Water Truck 3900 gallons and over	$ 15.92 **	3.33
Water Truck under 2500 gallons	$ 15.94 **	4.16

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($16.20) or 13658 ($12.15). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate

(weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

EXHIBIT D – PROJECT SPECIFIC PROVISIONS AND PROJECT PLANS AND SPECIFICATIONS

(585 PAGES)

1. **Special Conditions – See attached Project Specific Provisions (52 Pages)**

2. **General Provisions (77 Pages)**

3. **Technical Specifications (142 Pages)**
   Specification Title: Midfield Crossover Taxiway East and Realignment of Taxiways D7 and D8
   Date: 3/6/23

   General Technical Provision (10 Pages)
   Title: Midfield Crossover Taxiway East and Realignment of Taxiways D7 and D8
   Date: 3/6/23

4. **Construction Safety Plan Appendix C (32 Pages)**

5. **FAA Advisory Circular AC 150/5210-5D (14 Pages)**
   Date: 4/1/2010

6. **FAA Advisory Circular AC 150/5370-2G (95 Pages)**
   Date: 12/13/2017

7. **Plans (52 Pages)**
   Drawing Title: Construct Midfield Crossover Taxiway East and Realignment of Taxiways D7 and D8
   Date: 3/24/23
   Project Number: CP0994EAST
   Drawing 'A' Number: A-270520 to A-270571

8. **Other Attachments:**
   A. Geotechnical Report (45 Pages)
   Drawing Title: Report on Geotechnical Investigation FFZ Midfield Crossover Taxiways
   Date: 2/24/23

   B. Drainage Report (66 Pages)
   Drawing Title: Drainage Report - Construct Midfield Crossover Taxiway East and Realignment of Taxiways D7 and D8
   Date: 3/24/23

SAMPLE

CITY OF MESA, ARIZONA

MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAY D7 AND D8

4800 E. FALCON DRIVE

PROJECT NO. CP0994EAST / FAA A.I.P. 03-04-0023-035-2023

PROJECT SPECIFIC PROVISIONS

Version date: February 28, 2023

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ATTACHMENTS

Attachment A Release Form (1 page) – Not Used
Attachment B Background Check Guidelines and Security Forms (7 pages)
Attachment C Sewer Lateral Inspection Report (1 page) – Not Used

PROJECT SPECIFIC PROVISIONS

1. GAS LINE INSTALLATIONS: NOT USED

For those Projects including gas line installation; all gas system construction, installation, and testing shall comply with City of Mesa Gas Operations, Maintenance, Construction Practices and Emergency Plan Manual. Copies of this manual may be obtained from the Energy Resources Department at EnergyResourcesComplianceTraining@mesaaz.gov.

2. DUST CONTROL AND STORMWATER CONSTRUCTION PERMITS:

This project may involve the disturbance of surface/land area and as such the Contractors are advised that:

1. For Projects in Maricopa County: A Dust Control Permit and a Dust Control Plan is required by the Maricopa County Air Quality Department (MCAQD) for all projects that will disturb a surface area equal to or greater than 0.10 acre (4,356 square feet).
2. For Projects in Pinal County: A Dust Control Permit is required by the Pinal County Air Quality Control Department (PCAQCD) for all projects that will disturb a surface area equal to or greater than 0.10 acre (4,356 square feet) specifying the control measures that will be implemented to reduce fugitive dust emissions.
3. Coverage under the Arizona Department of Environmental Quality (ADEQ) Arizona Pollutant Discharge Elimination System General Permit for Discharge from Construction Activities to Waters of the United States (commonly referred to as the Construction General Permit, and herein referred to as the CGP) is required for projects that will disturb one or more acres of land, or that will disturb less than one acre but is part of a common plan of development or sale that will ultimately disturb one acre or more (e.g. single contract for multi-phase projects).
4. Projects that will disturb one or more acres of land, or will disturb less than one acre, but is part of a common plan of development or sale that will ultimately disturb one acre or more and that take place in any part of the urbanized areas of unincorporated Maricopa County are subject to the requirements of the Maricopa County Stormwater Quality Management and Discharge Control Regulation (Maricopa County Stormwater Regulation).

In calculating the area of surface/land (i.e. soil) disturbance, the Contractor must take into account storage and staging areas where surface/land disturbance will take place.

In addition to this project specification, the Contractor shall review, understand, and comply with dust and stormwater requirements as provided on the City's Environmental Requirements for Construction Activities webpage prior to submitting an offer to provide services to the City. That webpage is available at the following address: https://www.mesaaz.gov/business/environmental-requirements-for-construction-activities.

County Dust Permit and Dust Control Plan Requirements
The Contractor shall do one of the following:

1. Obtain a Dust Control Permit and:
   - Develop a Dust Control Plan, where required; and,
   - Submit a copy of these documents to the City for review.

2. Submit an exhibit to the City showing the location of all areas where surface disturbance activities will take place, including storage/staging areas, and a written and signed assurance that the project construction limits will not result in the disturbance of a surface area equal to or greater than 0.10 acre.

In addition to the above, for those projects requiring a dust control permit, the Contractor must submit a list of personnel to the City of those individuals having expertise and responsibility for compliance with dust control requirements as provided below:

1. If the project results in 0.1 acre or more of disturbed surface area, but less than 5 acres, the Contractor must submit to the City a copy of the individual(s) certification in Basic Dust Control pursuant to county requirements.
2. If the project results in 5 acres or more of disturbed surface area, the Contractor must submit to the City a copy of the individual(s) certification in Comprehensive Dust Control pursuant to county requirements.

The Contractor must ensure that a certified individual(s) meeting the above requirements, dependent on project size, is on site at all times dust generating activities are occurring. For each identified individual, the Contractor must submit proof of certification. The Contractor is responsible for ensuring that any subcontractor used for this project, and whose activities involve dust generating activities, is registered with the Maricopa County Air Quality Department. The Contractor must identify in its list of subcontractors all subcontractors so registered, and provide the subcontractor's registration number.

ADEQ Construction General Permit Requirements
The Contractor shall do one of the following:

1. Obtain coverage under the CGP and:
   - Develop a Storm Water Pollution Prevention Plan (SWPPP) meeting ADEQ and City of Mesa requirements; and,
   - Submit a copy of the SWPPP to the City for review and approval as provided below. Be advised that this submittal is a Shop Drawing and subject to the review timeframes as provided in the General Conditions.
2. Apply for and obtain a permit waiver and submit a copy of the Permit Waiver Certification to the City for review and confirmation.
3. Submit an exhibit showing the location of all areas where land disturbance activities will take place, including storage/staging areas, and a written and signed assurance that the project construction limits will not result in the disturbance of a land area equal to or greater than 1 acre.

The City has determined that the City and the Contractor both meet the definition of an "operator" as defined in the CGP and are therefore co-permittees. As such, both the City and the Contractor are required to file for coverage under the CGP. The Contractor shall prepare a SWPPP in the format specifically identified in the City's Review of SWPPP Content Form and shall submit a completed copy of such form with the SWPPP for review and approval by the City. This document is also available at the website referenced above.

The SWPPP shall incorporate best management practices as provided in the Flood Control District of Maricopa County's *"Drainage Design Manual for Maricopa County, Erosion Control"* dated November 28, 2012 and City amendments provided in Title 8, Chapter 5 of the Mesa City Code and as incorporated into the City's *"Environmental Requirements for Construction Activities in the City of Mesa"* manual. The SWPPP shall be maintained and updated as needed. Any deficiencies identified by the City or other regulatory agency shall be adequately addressed in a timely manner. The Contractor shall comply with posting requirements and shall make the SWPPP and all associated reports available to City inspectors and other regulatory agencies upon request.

The Contractor shall notify the City prior to submitting a Notice of Termination form to the ADEQ to cease coverage under the CGP (e.g. at completion of construction activities, after establishment of final stabilization, or because of a change in operators). The City shall conduct a final stabilization inspection. Upon approval, and within 30 days of final inspection, the City and the Contractor shall submit a completed and signed NOT form to the ADEQ to terminate coverage under the CGP.

Maricopa County Stormwater Regulation Requirements
For all projects required to obtain coverage under the ADEQ CGP as provided above, including those where a Permit Waiver Authorization has been obtained by the ADEQ, and where any construction activities are conducted in any part of the urbanized areas of unincorporated Maricopa County, the Contractor shall do one of the following:

1. Obtain approval from the Maricopa County Environmental Services Department (MCESD) and:

- Submit a copy of the SWPPP meeting ADEQ and City of Mesa requirements that has already been approved by the City to the MCESD for review;
- Submit to the City and the MCESD any additional information as required in the MCESD Checklist for Stormwater Pre-Construction Application; and,
- Submit to the City a copy of any notification of approval from the MCESD.

2. Submit a written and signed assurance that the project construction limits will not result in the disturbance of any land area in urbanized areas of unincorporated Maricopa County.

For any project that receives any notification or approval from the MCESD, as provided above, and that involves the installation, construction, or installation of new or additional impervious or semi-pervious surfaces (such as driveways, roadways, parking lots, recreation features); new buildings or additions to existing buildings; or permanent stormwater management facilities (i.e. retention basins, underground retention, etc.); the Contractor shall submit the following within fourteen (14) calendar days following the completion of land disturbing activities:

- One (1) copy of the SWPPP (final SWPPP including any significant changes made to it during construction);
- Two (2) sets of As-Built site plans;
- One (1) copy of a vicinity map (equivalent to that supplied under the Pre-Construction Application); and,
- One (1) copy of detailed driving instructions (equivalent to that supplied under the Pre-Construction Application).

This information is necessary for the City to submit its Post-Construction Application as required in the post-construction requirements established under the Maricopa County Stormwater Regulation. The City shall be responsible for forwarding this information to the MCESD when the City is the property owner, or will submit this information to the actual property owner(s) when the City is operating under an approved access agreement with another property owner(s).

Contractor Permit Applicability Assurances

Where the Contractor provides an assurance that the project will not require permitting under the MCAQD/PCAQCD dust rules, the ADEQ CGP, and/or the Maricopa County Stormwater Regulation, and it is later determined by a City inspector or regulatory agency that the project is subject to any such requirements, the Contractor shall obtain proper permits, certifications, or approvals, develop any required plans, and submit a copy of these documents to the City for review or approval at no additional cost to the City.

Dust Control and Stormwater Construction Permit Compliance Costs

The Contractor's pricing for compliance with dust and stormwater regulatory requirements shall include all material, labor, and other incidental costs related to:

- All dust and stormwater permit costs.
- Preparation of a Dust Control Plan and/or SWPPP.
- Modifications to the Dust Control Plan or SWPPP as required by the City or other outside regulatory agency, or updates/amendments as site conditions change.
- The installation and maintenance of dust control measures and structural stormwater BMPs and the implementation of non-structural stormwater BMPs as required in the CGP, identified in the SWPPP, or specified by the City or other outside regulatory agency.
- The removal of dust control measures and structural BMPs upon final stabilization and acceptance by the City.

All submittals required in this specification shall be submitted through the standard Shop Drawing submittal process.

3. PRE-BID REVIEW OF SITE:

A Pre-Bid review of the site has been set for Thursday April 27, 2023, beginning at 9:00 am local time. Participants shall gather at the site promptly at Falcon Field Airport Conference Room located at 4800 E. Falcon Drive in Mesa, Arizona. The Contractor shall provide his own transportation and shall bring a copy of the plans and specifications, if desired. The Pre-Bid site visit is recommended, but is not mandatory.

4. ENGINEERING INSPECTIONS:

See General Conditions Section 5.1.3.5

5. RELOCATION AND/OR ADJUSTMENT OF EXISTING FACILITIES, SERVICES AND ACCESS:

If relocation or adjustment of existing facilities is noted on the Plans, this is intended to include the relocation or adjustment of items appurtenant to the noted piece of Work, just as if they were specifically called out. If these appurtenant items are lost or broken during construction, they shall be replaced by Contractor with items of equal or better quality, at no additional cost to City.

6. SPECIAL NOTICE TO WATER LINE CONTRACTORS: NOT USED

Contractor is advised that the City of Mesa Water Resources Department requires a notice of seven (7) calendar days to coordinate the necessary exercising and checking of valves prior to shutting off any water valves.

Contractor shall review water maps (plats) with City Inspector and submit a written request to the City Inspector listing the valves that need to be exercised and when they need to be shut off for the Project. Requests shall be sent in time to allow the required seven (7) calendar day notification period.

Contractor shall also note that the City of Mesa Water Resources Department conducts water main sampling for bacteria tests from 8:00 a.m. to 3:00 p.m., Monday through Thursday, except holidays, and requires a minimum of two business days' notice prior to said sampling. Contractor shall schedule all required bacteria testing within this time frame. There shall be no additional payment or allotment of time to Contractor for failure to coordinate the sampling in accordance with the City's availability (as noted herein) to perform the sampling.

If Contractor schedules work such that sampling for bacteria tests is to be conducted on Friday, Saturday, or Sunday, Contractor may employ the services of a private laboratory to collect the samples and perform the required analytical tests. However, prior to using a private laboratory, Contractor shall submit the laboratory's information, credentials, and proposed test methods to the City for approval. The laboratory shall be certified by the Arizona Department of Health Services (ADHS) to perform coliform bacteria and Heterotrophic Plate Count (HPC) tests in accordance with American Water Works Association (AWWA), Standard C651-14, *Disinfecting Water Mains* (State certified). When available, test results from the private laboratory shall be sent via email to the City Inspector and shall also be emailed to WaterQualityVM@MesaAz.gov. Sampling and testing performed by the City is done at no cost to Contractor; whereas, the Contractor shall pay all costs (without any pass through to the City) for sampling and testing by the private laboratory.

7. STREET EXCAVATION BACKFILLING AND PAVEMENT REPLACEMENT: NOT USED

Contractor shall be responsible for backfilling and replacing pavement in all street excavations per City of Mesa Policy Statement for Street Trench Backfilling and Pavement Replacement, Revised September 29, 1999. Copies of this policy statement are available online at the link below or by calling 480-644-2251. A special permit is not required.

http://mesaaz.gov/home/showdocument?id=12294

SPECIAL ATTENTION IS CALLED TO THE POLICY STATEMENT REQUIREMENTS FOR TRANSVERSE TRENCHES. BACKFILL IN ALL TRANSVERSE TRENCHES SHALL BE CONTROLLED LOW STRENGTH MATERIAL (CLSM) PER MAG SECTION 728, WITH ONE-HALF SACK OF CEMENT PER CUBIC YARD OF MIX. ALL COSTS FOR FURNISHING AND INSTALLING THE CLSM MIX SHALL BE INCLUDED IN THE UNIT PRICES BID FOR THE APPLICABLE ITEMS. NO ADDITIONAL COMPENSATION WILL BE MADE FOR THE CLSM MIX.

IN ADDITION, THE PAY WIDTH FOR PAVEMENT REPLACEMENT SHALL BE IN ACCORDANCE WITH THE PAY WIDTHS LISTED IN MAG UNIFORM STANDARD SPECIFICATIONS SECTION 336.4 EXCLUDING ANY ADDITION FOR "T"-TOP PAVEMENT REPLACEMENT. IN COMPUTING PAY QUANTITIES BY THE SQUARE YARD, THE PRODUCT OF THE LENGTH OF PAVEMENT REPLACEMENT MEASURED ALONG THE

CENTERLINE OF THE TRENCH AND THE PAY WIDTHS LISTED, EXCLUDING ANY ADDITION FOR "T"-TOP PAVEMENT REPLACEMENT, SHALL BE USED. NO DIRECT PAYMENT WILL BE MADE FOR SURFACE COURSE PAVEMENT REPLACEMENT OUTSIDE OF THE SPECIFIED PAY WIDTHS. THE CONTRACTOR SHALL INCLUDE THE COST FOR SURFACE COURSE PAVEMENT REPLACEMENT AND MILLING THAT IS BEYOND THE SPECIFIED PAY WIDTHS IN THE UNIT PRICE BID PER SQUARE YARD OF PAVEMENT REPLACEMENT.

A cash bond, as stipulated in the policy statement, will not be required. However, if Contractor fails to comply with the Policy requirements, City will proceed to make the necessary corrections. Contractor will be billed for the corrective action, and the amount of the bill will be withheld from funds due Contractor.

The amount of each billing shall be either $1,000.00 or the actual accumulated charges for employee's time, materials, and equipment, whichever is greater. Employees' time will be billed at each individual's hourly rate plus the applicable City overhead rate. Any materials used will be billed at cost. Equipment rates will be based on the most recent schedule of equipment rental rates for forced account Work, as published by the Arizona Department of Transportation.

8. OPEN TRENCH AND ASPHALT CONCRETE PAVEMENT REPLACEMENT: NOT USED

The maximum length of open trench from the point of initial excavation to the point where finished grade of native and/or ABC backfill has been installed shall not exceed 300 feet.

Where pavement replacement is called for, the maximum length of exposed ABC backfill prior to the installation of base course asphalt concrete shall not exceed 300 feet. Surface course asphalt concrete shall not be installed sooner than two (2) weeks after base course, but not later than three (3) weeks. All trenches six (6) feet wide or greater shall have all courses of pavement replacement installed with a self-propelled laydown machine meeting the requirements of Subsection 321.5.2

9. THICKNESS REQUIREMENTS FOR ASPHALT CONCRETE PAVEMENT REPLACEMENT: NOT USED

Unless otherwise specified on the Plans, final asphaltic concrete pavement replacement for this Project shall comply with COM Detail M-19.04.1 and M-19.04.2 (which also references COM Detail M-19.01). By way of additional clarification, the streets included in this Project have the following designations.

DESIGNATION/CLASSIFICATION	ROADWAY/STREET NAMES
Arterial Street	
Major Collector Street	
Collector Street	
Local Street – Commercial	
Local Street – Industrial	
Local Street – Residential	

10. NEW WATER METER PROCEDURES: NOT USED

Contractor shall sign a Meter Order at the Building Safety Division, 55 N. Center Street, at least seven (7) calendar days prior to requesting a preliminary inspection of the water service and vault. After inspection and approval of the service and vault, the City shall deliver the meter to Contractor for installation. Contractor will be charged for the meter; Contractor shall not be charged for any applicable Development Fees. Contractor will be billed for all water usage through the meter during the time of the Contract.

11. WATER METER REPLACEMENT PROCEDURES: NOT USED

Contractor shall be responsible to remove the existing water meters and reset them in the new water meter boxes in accordance to the following procedures:

1. Contractor shall install the new water service and water meter box. The existing water service shall remain operable while the new service is being installed.

2. Contractor shall tag the existing water meter with the site address prior to removal.

3. Contractor shall remove the existing water meter and immediately reinstall it in the new water meter box to make the new water service operable.

4. At the end of each Working day, Contractor shall provide a list to the City Inspector of the sites/addresses where the existing water meter has been transferred to the new water service.

5. City of Mesa will remove the existing water meters and replace them with new meters after Contractor is complete with his/her Work at no cost to Contractor.

If it is determined that Contractor has set an existing meter incorrectly (i.e. meter installed at the incorrect address, meter installed backwards, leaking meter, etc.) Contractor will be assessed a one-time fifty dollar ($50.00) fine per meter for City to investigate and rectify the problem. In addition, if Contractor does not make a proper connection between the relocation water meter and the existing private service line, or damages the customer's private service line, Contractor will be responsible to pay for the cost of the lost water as determined by City.

12. EXCAVATIONS ENCOUNTERING CALICHE:

Contractor is advised that Caliche, which is a calcareous soil, is a common subsurface condition in the Mesa area and may exist within the limits of this Project. Caliche varies in density and in strength. Caliche soils may contain gravel and particles of rock cemented together by calcium carbonate.

As stipulated in Subsection 601.2.1, of Uniform Standard Specifications, Contractor shall perform excavation of whatever substances encountered. This shall include Caliche. Encountering Caliche shall not be considered a "Differing Site Condition" and shall not be considered under the requirements of Subsection 104.2.2A of the Uniform Standard specifications.

13. TRAFFIC CONTROL AND BARRICADES: NOT USED

It shall be the responsibility of Contractor to comply with the City of Mesa's Temporary Traffic Control Manual (TTCM) (latest revision found at https://www.mesaaz.gov/business/temporary-traffic-control-permits) and, where noted, the Manual on Uniform Traffic Control Devices (MUTCD) (latest revision).

TEMPORARY TRAFFIC CONTROL (TTC) PERMIT

The Contractor shall obtain a Temporary Traffic Control (TTC) Permit from the City of Mesa Transportation Department, through DIMES (*Digital Innovation for Mesa Electronic Services;* https://aca.accela.com/mesa/), prior to restricting or closing any street, sidewalk, pedestrian pathway or alley within the City of Mesa. Individual plans shall be submitted for each unique traffic control configuration. This can be done with multiple Traffic Control Permits or with one permit under which multiple configurations are defined and approved. A Temporary Traffic Control Permit Application may be submitted online using the application process found on the City of Mesa Transportation web page (https://www.mesaaz.gov/residents/streets-transportation.) There is no fee for Temporary Traffic Control Permits for this Project.

Contractor shall submit a traffic control plan and project schedule to the Engineering Department for review and approval prior to submitting for the formal TTC for all Projects allowed to have traffic restrictions. This submittal shall show placement of all traffic control devices and proposed temporary striping during all phases of construction, including all conflicting signage to be covered/removed or relocated, or other features that may conflict with the placement of temporary signage. This plan shall be professionally drawn and shall be submitted to the Engineering Department (through the standard Shop Drawing submittal process and uploaded to CIPMesa) no later than fourteen (14) calendar days prior to any work commencing on site and fourteen (14) calendar days prior to any proposed changes thereto.

For any proposed arterial street closures, arterial half-street closures, arterial-to-arterial intersection closures, or other restrictions with similar major traffic impacts; a minimum lead time of thirty (30) calendar days shall be required for review and approval by the Engineering Department prior to work commencing. These requests will be reviewed on a case-by-case basis.

Any request to close left turn lanes is considered a major traffic restriction. Where approved by the City, the Contractor shall provide the City Inspector a written request and schedule indicating days, times and specific locations where left turns will be prohibited at signalized intersections. When left turns are prohibited at signalized intersections with protected left-turn signals, Contractor will notify the City Inspector at least fourteen (14) calendar days in advance. The City Inspector will notify the City of Mesa Transportation-ITS Group (480-644-5888) to make arrangements for arrow indications to be turned off during the prohibited times. The following are considered major traffic restrictions:

- Street closures
- Half-street closures
- Intersection closures
- Left-turn prohibition at an arterial / collector
- Peak hour reduction in through lanes

Additional City reviews, coordination, and field meetings may be required. Clear, complete and accurate supporting documentation is critical for the review of these requests. The restrictions discussed in this section shall be used only for the active prosecution of the Work. Restrictions shall not be in place unless necessary to prosecute the Work.

DESIGNATED RESPONSIBLE PERSON

In addition to the responsibilities detailed in the TTCM, the designated responsible person shall:

1. Inspect all barricading and traffic control devices twice daily, and submit a daily (including weekends and holidays) reports, in writing, to the City Inspector of all inspections the next workday;

2. Ensure that existing City-owned traffic signals do not conflict with barricades and signs or give misleading signals to pedestrians and motorists. He/she shall immediately bring conflicting conditions to the attention of the City Inspector. The City Inspector will coordinate with the City's Intelligent Transportation Systems (ITS) Group (480-644-2160) for any required changes to traffic signal sequencing, timing, or outages;

3. Ensure that flaggers, when employed, are trained in accordance with O.S.H.A. regulations (29 CFR 1926.201 Signaling); and shall submit proof of certification prior to the flagger beginning Work. Proof of certification shall be available at the Work site;

4. Immediately respond to all call-outs by the City Inspector, the stand-by City Inspector, Traffic Barricade Coordinator, or Base Operations; cooperate with Police or Fire Department Investigators; and, re-establish barricades and traffic control devices, as necessary, at no additional cost to City.

TRAFFIC SIGNALS

The cost for any damage to traffic signal equipment (loop detectors, pull boxes, conduit, etc.) is Contractor's responsibility. All repair Work will be done by Contractor at their own expense to the satisfaction of City of Mesa Traffic Signal Group. Copy of standards may be obtained from the City of Mesa's Transportation Department website at https://www.mesaaz.gov/residents/streets-transportation.

ADVANCE PUBLIC NOTICE

Unless an alternative is approved in the TTC permit, advance notice to the public via Portable Changeable Message Signs (PCMS) shall be required. The following notification requirements are in addition to the requirements detailed

in the TTCM. as stipulated in the City of Mesa Temporary Traffic Control Manual, Section 2.6 Advance Notice for Restrictions.

Advance notice via PCMS may be required in other situations as determined solely by the Engineering Department.

The Portable Changeable Message Signs shall be placed at each ends of the Project and at adjoining arterial and collector roadways. Unless otherwise determined by City, the Portable Changeable Message Signs shall be removed 48-hours after the indicated traffic restrictions have commenced.

RESTRICTIONS AND CLOSURES

Any equipment and material not actively being used to prosecute the work shall not be stored in the right-of-way unless otherwise approved by the City Inspector. Roadway and sidewalk restrictions and closures are limited to construction activities and are not permitted for the purpose of staging or storing equipment or debris. The storage of Tracked Equipment may be allowed, as determined solely by City.

Fence panels (*chain link or otherwise*) shall not be used in any way to cover open excavation in the right of way. If not located in active traffic area and behind appropriate traffic control barricades, fence panels may be allowed, as determined solely by City. This fencing shall remain up-right and shall restrict all access to the excavation. Fence panels shall not be laid across excavation at any time during construction activities.

No flagging of traffic will be permitted on arterial or mid-section collector streets unless approved by the TTC Permit and the City Inspector. Flagging operations shall be in accordance with the TTCM.

COORDINATION

Contractor shall coordinate and schedule Work with other Contractors in the vicinity to avoid conflicts, ensure compatibility of traffic controls, avoid duplication of signing, and minimize disruption.

Other Work may include, but is not limited to other Contractors, Utilities, City crews, and private development. Conflicts between barricading permits will be resolved through the TTCP process. Current ongoing or proposed activities include the following:

1. _____
2. _____
3. _____

Contractor shall also review the City Mesa Traffic Restrictions, Alerts, and Closures Map (mtrac) and the current City Capital Improvement map.

https://gis.mesaaz.gov/mtrac/
https://gis.mesaaz.gov/active_CIP

LOCAL ACCESS REQUIREMENTS

In addition to the requirements specified in the City of Mesa Temporary Traffic Control Manual, the following apply:

Contractor shall restore full access as soon as possible or as determined by the City Inspector. Any local street restrictions imposed shall be such that local area traffic circulation is maintained.

Business access shall be maintained at all times in a manner acceptable to the City Inspector. Any business access restrictions shall be coordinated with the affected business in writing at least 72-hours prior but not earlier than one (1) week prior to imposing restrictions unless otherwise approved by the City Inspector.

Local access shall be maintained at all times on frontage roads. Frontage roads shall not be used for through traffic, equipment parking, material storage, or spoil stockpile area. Frontage roads shall follow the same notification requirements as described above.

Access to fire stations, police stations, hospitals, City parks, and churches shall be maintained at all times unless otherwise approved by the City Inspector. When access restrictions are necessary, Contractor shall notify and coordinate such access restrictions with the responsible person in charge of the affected facility, at least seven (7) calendar days prior to any restrictions and shall restore access as soon as possible or as directed by the City Inspector. Contractor shall maintain the emergency entrance to all hospitals by way of a paved lane for emergency vehicles at all times for the duration of the Project. Contact information is as follows:

Fire Station access:	Mesa Fire Department (480-644-3388 or 480-644-2405)
Police Station access:	Mesa Police Department (480-644-2211 or 480-644-4054)
Hospital access:	Hospital Administrators
City Parks access:	Mesa Parks Superintendent (480-644-3097)
Church access:	Church Clergy

SCHOOL ZONE REQUIREMENTS

Contractor shall schedule work impacting schools during times when school is not in session, or as approved by the City Inspector. Contractor shall provide safe school zones, crosswalks, and walkways for students attending nearby schools during all hours of school use unless otherwise approved by the City Inspector. If an existing school bus route is impacted by the Project, Contractor shall coordinate with Engineering Public Relations through City Inspector at least seven (7) calendar days prior to the Work. Contractor shall restore unrestricted access as soon as possible or as directed by the City Inspector.

TRANSIT SERVICES

Construction activities affecting public transit will need to be coordinated with the City Inspector and the City Transit Coordinator.

VERTICAL PAVEMENT DROP

In addition to the requirements specified in the City of Mesa Temporary Traffic Control Manual, longitudinal drops shall be avoided and will not be permitted.

SPECIAL EVENTS

When special events are scheduled to take place within or adjacent to the Project during the construction of the Project, Contractor shall coordinate and schedule his Work to mitigate any impact to the event at no additional cost to City.

BARRICADE MORATORIUMS

No traffic lane restrictions to this Project will be permitted on public roadways during the following:

Spring Training
Easter Pageant
Temple Lights

SOLID WASTE COLLECTION REQUIREMENTS

Contractor shall ensure sanitation pick-up is not affected by relocating trash containers, or by providing alternate measures acceptable to the Environmental Management and Sustainability Department (480-644-2688).

SIGNING AND PAVEMENT MARKING REQUIREMENTS

Contractor shall be responsible for maintaining the necessary traffic control devices until the area where treatment has been applied has been re-striped and re-signed. Coordination of re-striping and re-signing shall be handled by the City Inspector. Contractor, through the City Inspector, shall notify the Transportation Department at least seven (7) calendar days prior to the time the roadway signing and striping is scheduled. No additional payment shall be made to Contractor for this coordination. Unless otherwise specified on the Plans or in these Specifications, re-

striping and re-signing shall be the responsibility of Contractor and the cost thereof included in appropriate bid items on the bid schedule.

BASIS OF PAYMENT

Except as otherwise noted within this section, barricades, traffic control devices, salaries, and other Work or materials required by this section are non-pay items. Per MAG Section 101, a non-pay item is an item of Work for which no separate payment will be made, the cost of which is to be included as an incidental cost for associated item(s) included on the bid schedule or Schedule of Values. All costs to comply with these requirements shall be included in the Contractor's pricing.

14. TEMPORARY PAVEMENT MARKERS: NOT USED

Unless otherwise directed by the City Inspector, temporary pavement markers shall be installed immediately after paving to allow traffic barricades to be removed and traffic to use as many lanes as possible. Unless otherwise determined by the City Inspector, temporary pavement markers shall be installed for all longitudinal lines including but not necessarily limited to two-way left turn lines, lane lines and gore lines at exclusive turn lanes.

The Contractor shall maintain the temporary pavement markings until permanent striping is installed and complete in-place. After the permanent striping is completed, Contractor shall remove any temporary markers that remain in-place that are not in-line with the permanent striping.

The requirements of this section shall be non-pay items.

15. OFF-DUTY MESA POLICE OFFICER AND PATROL CAR: NOT USED

The Contractor shall provide off-duty Mesa police officer(s) with or without official Mesa Police Department patrol car(s) (as determined solely by the City, acting through the City Inspector) to control traffic at signalized intersections when traffic is restricted in the intersection, when work is underway in the intersection, or as otherwise directed by the City Inspector. Contact Information, Hiring Requirements, Off-Duty Agreement are available at the link below. The Contractor is responsible for contacting the Mesa Police Department to request off-duty Mesa police officer(s) and Mesa Police Department patrol car(s).

https://www.mesaazpolice.gov/services/off-duty-employment

The off-duty Mesa police officer(s) shall be responsible for transporting the official police patrol car(s). At no time will the Contractor be allowed access to or control of the official police patrol car(s). For the purposes of this section, unmarked police vehicles do not comply with the project requirements.

If no Mesa Police officers are available for a given date and time, off-duty State Department of Public Safety (DPS) officers or Maricopa County Sheriff's deputies may be used until the next date Mesa officers are available.

16. SECURITY OVERSIGHT BY OFF-DUTY MESA POLICE OFFICER: NOT USED

The Contractor shall provide off-duty Mesa Police Officer(s) and/or off-duty City of Mesa Municipal Security Officer(s) to escort and monitor all crews working on site. The Contractor is responsible for coordinating this effort and ensuring that all crew members are escorted while in the building and surrounding secured areas. Contact Information, Hiring Requirements, Off-Duty Agreement are available at the link below. The Contractor is responsible for contacting the Mesa Police Department to request off-duty Mesa police officer(s) and/or off-duty City of Mesa Municipal Security Officer (s).

https://www.mesaazpolice.gov/services/off-duty-employment

Off-duty City of Mesa Municipal Security Officer(s) used for this Project shall be limited to those individuals who, for their "on-duty" performance as municipal security officers, are directly employed by City as official City of Mesa employees and shall not include those who are employed by an outside firm that provides said services to City through Contract or by other mechanism.

Planning, staging and execution of the Work shall be such that no more than two security escort officers shall be required at any one time (e.g., for Contractor employees working in two areas of the building), as judged solely by the City Inspector.

17. HOT ASPHALT PAVEMENT: NOT USED

Unless otherwise noted, all hot asphalt pavement shall meet the "Hot Asphalt Mix Criteria", effective January 1, 2021, established by the East Valley Asphalt Committee.

Copies of the "Hot Asphalt Mix Criteria" dated January 1, 2021, are available on the City of Mesa Engineering Web link: https://www.mesaaz.gov/home/showdocument?id=3260

18. OVERHEAD UTILITY LINES AND POLES: NOT USED

Contractor is advised that Work on this Project is expected to require coordination with Utility Companies who run and operate overhead lines and poles. The coordination may include, but not be limited to the following activities: pole bracing, de-energizing of lines, and temporary relocations.

Contractor is responsible to contact the applicable Utility Company representative and discuss his proposed construction methods; in Order to determine what actions the Utility Company must take and the costs related to those actions. Contractor shall include these costs in the applicable bid items for this Project.

The primary and the backup representatives for his review and cost determinations are as follows:

COMPANY	PERSONNEL	OFFICE	MOBILE	FAX
CenturyLink	1. Ronijean Grant-Sloan	480-768-4294	480-748-1352	
Salt River Power	1. SRP Safety Specialist	602-236-8117		

Contractor is advised the above list does not include local cable television companies. Contractor shall determine if cable television lines are involved in the Project limits and shall contact them for similar information.

19. HORIZONTAL CURB CUTS: NOT USED

Horizontal sawcutting of existing concrete curbs to accommodate installation of new driveways and sidewalk ramps shall comply with the following requirements.

1. Shall accommodate the dimensions of the driveway or sidewalk ramp as shown in the Approved Plans, Specifications and Standard Details.
2. The horizontal sawcut shall be made from backside of the existing curb to the flowline of the existing gutter.
3. The horizontal sawcut shall be made to provide the following dimensions at flowline of existing gutter:
   a. Provide zero-inch lip (flush) at flowline of existing gutter for new driveways.
   b. Provide zero-inch lip (flush) at flowline of existing gutter for new sidewalk ramps.
4. The new cut edge along both the front and back of curb shall be ground smooth and rounded to a 0.5-inch radius.

20. ASBESTOS CEMENT PIPE (ACP): NOT USED

The removal of Asbestos Cement Pipe (ACP) is regulated by under the Occupational Health and Safety (OSHA) Safety and Health Regulations for Construction Rule (CFR 29 1926) and is considered to be Class II asbestos Work. Depending on the amount of asbestos and removal process, the United States Environment Protection Agency (USEPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) Rule (40 CFR 61, subpart M) may apply.

The Industrial Commission of Arizona administers and enforces state laws relating to the protection of life, health, safety and welfare of Arizona's employees, including laws relating to occupational safety and health. The Maricopa County Air Quality Department regulates all asbestos renovation and demolition within Maricopa County. The Contractor is solely responsible for compliance with the above regulations.

The removal and disposal of ACP must be performed in accordance with the City's current Policy Statement for Removal and Disposal of Asbestos Cement Pipe. That policy statement is available on the Engineering Department's website at http://www.mesaaz.gov/home/showdocument?id=3318.

Payment for removal and disposal of ACP shall be per the Bid Item "Removal and Disposal of Asbestos Cement Pipe" in the bid proposal on a per linear foot basis. This bid item shall be for the removal of the ACP and all appurtenances and shall include all costs for proper abatement procedures if necessary and all costs for disposal of the pipe and appurtenances.

21. FRAME AND COVER GRADE ADJUSTMENTS:

All frames and covers for valves, survey monuments manholes, etc., in paved areas shall be adjusted to finished grade after placement of asphalt concrete pavement. Adjustments shall be based on two different types of frame and cover.

The first are "critical frames and covers", which are defined as all frames and covers on gas valves, pressurized and active large diameter (greater than 16-inches in diameter) water line valves and valves or manholes adjacent to traffic detector loops. All "critical frames and covers" shall be adjusted to finished grade two times: once after placement of the asphaltic concrete base course, and again after placement of the asphaltic concrete surface course.

The second are "non-critical frame and covers", which are defined as frames and covers on pressurized and active small diameter (equal to or less than 16-inches in diameter) water line valves, non-pressurized water lines greater than 16-inches in diameter, sewer and storm drain manholes, and survey monuments. All "non-critical frames and covers" shall be adjusted to finished grade once, after placement of asphaltic concrete surface course.

For sewer manhole frames and covers, Contractor shall install a debris shield over the base of the manhole to catch and falling debris during the adjustment process. The debris shield shall be constructed of solid, durable material capable of containing fallen debris and shall be of sufficient diameter to prevent any debris from entering the sewer lines ("Debris Shield" by Pipeline Support Products, Inc., or approved equal). A Shop Drawing of the debris shields to be used shall be submitted to the City Inspector for approval.

The debris shield shall be installed as soon as the manhole shaft is installed, or prior to beginning paving operations, or prior to removal of any adjusting rings, frames or covers (whichever comes first) and shall remain in place throughout the entire adjustment process. The debris shield shall not be removed until all debris has been removed from the manhole and the final adjustment has been completed and approved by the City Inspector. The cost of providing and using the debris shields shall be a non-pay item.

Contractor will be required to "Sawcut" all pavement removals for the cover grade adjustments at no additional cost to City. The following additional requirements shall also apply:

1. Within 48-hours after installation of asphaltic concrete base course, Contractor shall begin making frame and cover adjustments for the "critical frames and covers" unless otherwise approved in writing by the City Inspector.

2. Within 48-hours after installation of asphaltic concrete surface course, Contractor shall begin making all frame and cover adjustments unless otherwise approved in writing by the City Inspector.

3. Contractor shall complete all frame and cover adjustments in one traffic lane at a time before beginning frame and cover adjustments in other lanes.

4. The tolerance limits of all frame and cover adjustments shall not exceed **1/8-inch** above or below the existing asphaltic concrete surface course immediately adjacent to the concrete collar. Contractor shall verify that the frame and cover adjustment is within the tolerance limits prior to placement of the concrete collar. If the frame and cover adjustment is not within the tolerance limits, Contractor shall readjust the frame and cover to within the specified tolerance limits at no additional cost to City.

5. A minimum of seven (7) calendar days prior to installation of asphaltic concrete base course, Contractor shall provide temporary markings of all frames and covers and shall prepare and submit to the City Inspector a copy of swing ties to all frames and covers in a format acceptable to the City Inspector. These markings are for the benefit of City, to be used in emergency situations.

6. For this project, frame and cover grade adjustments shall be a non-pay item.

22. CONSTRUCTION SURVEY AND STAKING:

Contractor is responsible for providing construction survey and staking services.

1. **GENERAL**
   Contractor shall furnish the services of a surveyor professionally licensed or registered to perform land surveying in the State of Arizona. Contractor shall advise the City in writing the name and license number of the person who will perform the survey Work as a submittal. City will initially provide the alignment control points and the control elevation benchmark(s). All other surveying in connection with this Contract shall be the responsibility of Contractor-provided surveying service (RLS). At a minimum these services shall include Pre-Construction Surveys, Construction Surveys and Post-Construction Surveys and their accuracy shall be third Order or better.

2. **PRE-CONSTRUCTION SURVEYS**
   Pre-Construction Surveys include, but are not limited to:

   a. Valve and manhole ties: Prior to the start of construction, the RLS will reference all existing valves and manholes, and survey monuments to a permanent feature. A copy of all reference ties shall be provided to the City Inspector and to Contractor.

   b. Topographic Survey: The RLS shall perform topographic surveys necessary to ascertain unforeseen conditions as requested by the Engineer. These requests shall be considered additional services. The cost for these additional services shall be agreed to by the Engineer prior to the Work being performed.

   c. Elevations: When it is a requirement of the Contract for Contractor to pothole existing utilities to verify their location and elevation, the RLS shall ascertain stationing and elevations of the existing utilities and compute slopes and distances to insure potential conflicts are identified. The RLS shall provide this data to the City Inspector and Contractor sufficiently in advance of construction that remedial action can be taken.

3. **CONSTRUCTION SURVEYS**
   During construction the RLS shall provide survey services including, but not limited to:

a. Staking: The RLS shall provide all construction staking, including right-of-way and easements, slope staking, line and grade, and other staking, from which measurement of earthwork and structures can be taken conveniently by the construction force and which will ensure the Project is constructed according to the Plans.

b. Quantity Surveys: Quantity survey shall be conducted, and the data derived from these surveys shall be used in computing the quantities of Work performed and the actual construction completed and in place.

(1) Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested and shall make the computations based on these surveys. All these surveys shall be conducted under the direction of a representative of the City Engineer, unless the City Engineer waives this requirement in a specific instance. Contactor shall make the computations based on the surveys for any periods for which progress payments are requested.

(2) Promptly upon completing a survey, Contractor shall furnish the originals of all field notes and all other records relating to the survey or the layout of the Work to the City Inspector, who shall use them as necessary to determine the amount of progress payments. Contractor shall retain copies of all such material furnished to the City Inspector.

4. **POST-CONSTRUCTION SURVEYS**
Upon completion of construction and prior to submittal of record drawings, the RLS shall conduct the necessary surveys to verify final alignment and grade, location and evaluation of petro utility stubouts and permanent ties for all City-owned valves, fire hydrants, flushing lines, corporation stops, and other features as directed by the City Inspector. Promptly upon completing the survey the RLS shall furnish the original of all field notes and records relating to the post-construction surveys to the City Inspector. A copy of the field notes and records shall be retained by Contractor for use in preparation of the record drawings.

5. **DATUM**
Unless otherwise specified, all surveys shall be conducted using NAVD88 vertical datum.

6. **QUALITY ASSURANCE**
From time to time the City of Mesa Chief Surveyor shall cause a quality assurance survey to be performed. Such survey may include, but not be limited to:

a. Review of records, methods, procedures and techniques.
b. Verification of computations.
c. Resurveying by City crews using in-place hubs, stakes and monuments.

7. **DEFECTIVE WORK**
The Chief Surveyor will notify Contractor of any non-compliance with the foregoing provisions and the actions to be taken. Contractor shall, after receipt of such notice, immediately take corrective action. If Contractor fails or refuses to comply promptly, the Chief Surveyor may issue an Order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to any such Stop Orders, nor ANY WORK PERFORMED WHICH MUST BE REMOVED AND REPLACED AS A RESULT OF DEFECTIVE SURVEY WORK., shall be made the subject of a claim or extension of time or for excess costs or damages by Contractor. IF RECURRING DEFICIENCIES INDICATE THE REGISTERED LAND SURVEYOR IS NOT COMPETENT TO PERFORM THE REQUIRED SURVEYS, CORRECTIVE ACTION SHALL BE TAKEN AS DIRECTED AND PROGRESS PAYMENTS WILL BE WITHHELD UNTIL SUCH CORRECTIVE ACTION HAS BEEN COMPLETED.

8. **CERTIFICATION**

Upon completion of all survey Work on this Contract, the RLS shall submit a letter to the City Engineer, on letterhead stationery, containing the following paragraph:

> "I hereby certify that all elevations, dimensions, measurements, tabulations and computations provided by me on this Contract are true, correct and accurate to the best of my knowledge and belief."
>
> _____
> (Typed Name)
> Registered Land Surveyor

This letter shall cite the City Project Name and Number and shall be stamped with the RLS's professional stamp.

23. ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM (AZPDES) DE MINIMIS PERMIT COVERAGE:

NOT USED

This Project includes the discharge of non-stormwater to a water of the United States or a regulated municipal separate storm sewer system (MS4). These discharges are regulated by the Arizona Department of Environmental Quality (ADEQ) under their Arizona Pollutant Discharge Elimination System (AZPDES) De Minimis Program which requires a permit for these discharges. The Contractor shall apply for coverage for these discharges and shall develop and implement a Best Management Practices Plan (BMP Plan). The Contractor shall also conduct all monitoring required under the De Minimis permit.

In the case where the City determines, or that Contractor expects, that a single-source or project-wide discharge is expected to be continuous for a duration of more than four (4) days, or when a discharge will exceed 0.25 million gallons in any one day, the Contractor shall submit a signed BMP Plan, including copies of the ADEQ Authorization Certificate, to the City for approval prior to any work commencing on site that would result in any such discharge. In these cases, the Contractor shall also submit copies of all required monitoring records to City and make such records available for inspection throughout the duration of the project. Receipt of such records shall be a condition for processing progress payments related to Project Work.

The Contractor shall be responsible for properly filing for permit termination (Notice of Termination, or NOT) and for submitting all information required for filing permit termination to the ADEQ.

All submittals required in this specification shall be submitted through the standard Shop Drawing submittal process.

24. TEMPORARY UTILITIES FOR CONSTRUCTION:

"Temporary utility service" shall be defined as any utility service or usage by Contractor prior to Final Acceptance of the facility/Project ("facility") by City. For convenience, temporary utility services are classified as either "Type 1" or "Type 2." A "Type 1" service is a utility service established by Contractor for their use during construction, which service will not become part of the permanent utility service lines for the facility. A "Type 2" service is a utility service line and/or meter which will become part of the utility service lines for the facility. Any use of a Type 2 service or meter by Contractor prior to Final Acceptance of the facility by City is included in the definition of "temporary utility service." Contractor shall be required to install and maintain both Type 1 and Type 2 temporary utility services as necessary for execution of the Work under this Contract.

In the case of Type 1 services, it shall be Contractor's sole responsibility to make all arrangements as necessary for electric, telephone, gas, cable, water, and other utility services, necessary for execution of the Project Work. Contractor's responsibility shall include the setting of temporary power and telephone poles, the temporary extension of utility lines, and installation of meters. Contractor shall pay all deposits, installation fees, service charges, usage charges, monthly flat rate, and all other expenses associated with such service for the duration thereof.

For Type 2 services, Contractor shall install the service lines and meters for the facility as required by the Project Plans and Specifications. For Type 2 services, Contractor will be required to open an account with the utility company (or companies, if applicable) in Contractor's name and maintain the account in Contractor's name until Final Acceptance of the facility by City. Contractor shall pay all deposits, installation fees, service charges, usage charges, monthly flat rates, and all other expenses associated with the service through Final Acceptance of the facility by City, including utility usage for final testing and startup. However, in the case of City owned utilities, unless otherwise noted on the Plans or in the Bid Schedule, Contractor shall not be required to pay for the cost of the meter, nor the development fees associated with meter installation. Upon Final Acceptance of the facility by City, the utility service accounts and meters for the facility will be transferred to City. Contractor shall pay to the utility companies all amounts incurred prior to the transfer, including any transfer charges.

If Contractor uses water from City's water system for construction water, Contractor shall obtain a fire hydrant meter from the Building Safety Division and place the meter in his name. All construction water shall be obtained through the hydrant meter. Contractor shall pay all fees related to the hydrant meter and all water bills for construction water. Construction water shall include, but not be limited to, water for pressure testing, leakage testing, chlorination, backfill and compaction of any material, dust control, cleaning, domestic use, and sanitary use.

25. FLOOD IRRIGATION: NOT USED

When the Project is within an area subject to flood irrigation, Contractor shall contact and obtain a schedule from the person(s) responsible for scheduling and/or delivery of the irrigation water. Contractor shall Work around those dates and protect their Work from water damage. Since flood irrigation is a scheduled event, **NO** additional time or compensation will be provided to Contractor for his coordination or protection of his Work.

26. ASBESTOS-FREE FACILITY MATERIAL CERTIFICATION:

The installation or use of any materials containing a detectable quantity of asbestos for this Project is strictly prohibited. A detectable quantity of asbestos is defined as any detectable amount of asbestos using the method specified in 40 CFR 763, Appendix E, Subpart E, Section 1, Polarized Light Microscopy.

The General Contractor is responsible for insuring and certifying that all materials installed and used for this project are free of any detectable quantities of asbestos. The certification is included as an attachment and covers all Work and materials provided by the General Contractor, their Subcontractors, or other under the direction of the General Contractor. If there is no General Contractor, all other Contractors performing Work on this Project shall provide the same certification. This certification form must be signed, notarized, and submitted prior to final payment.

The asbestos material prohibition shall supersede any material that might inadvertently be specified in the Project Plans. The City shall be notified in writing seven (7) days prior to ordering any material that may contain detectable quantities of asbestos if the Approved Plans specify the use of such material. The City shall have the discretion to prohibit the use any material containing detectable quantities of asbestos and shall approve or disapprove associated changes in costs. Should the Contractor install material containing detectable quantities of asbestos without proper notification to the City, the Contractor shall remove and replace such materials with a material that does not contain detectable quantities of asbestos at no cost to City.

The installation of asbestos cement pipe (ACP) is not subject to the above prohibition and may be installed where specified on City projects.

27. AFTER HOURS WORK AND TEMPORARY USE PERMIT:

See General Conditions Section 5.1.3.5

28. HOURS INSPECTIONS ARE AVAILABLE:

See General Conditions Section 5.1.3.5

29. DEFERRED SUBMITTALS FOR THE BUILDING PERMIT PROCESS: NOT USED

Contractor shall submit the deferred submittals to the City's Engineering Department using the standard Shop Drawing Submittal Process outlined elsewhere in these specifications. The City's Engineering Department (and/or their representatives) will review said submittals to make sure they meet the City's needs, are in compliance with the Contract Documents, and are otherwise acceptable for further review by the Building Safety Division. If the City's Engineering Department requires corrections based on their review, Contractor shall make the corrections and resubmit the revised documents to the Engineering Department using the Shop Drawing Submittal Process. When the submittals are approved by the Engineering Department, the Engineering Department will route the submittals to the City's Building Safety Division for their review or will direct Contractor to take the submittal to the Building Safety Division. Multiple reviews by Engineering Department and/or the Building Safety Division may be required.

Review times by the City Building Safety Division can exceed four (4) weeks for each review cycle, Contractor shall submit the information related to deferred submittals expeditiously. Multiple reviews may be required if the initial submittal is incomplete, inaccurate, or otherwise unacceptable. Contractor shall schedule the deferred submittals and Work accordingly. City will not grant extra Contract time or additional compensation due to multiple review cycles.

Contractor shall include in each deferred submittal the following information: information required Section 4.7.3 of the General Conditions titled "Shop Drawings," information and calculations as required by the Project Specific Provisions and Specification, and any other information that is necessary to obtain approval from the Building Code officials. To the extent required by State law, the deferred submittals shall be signed and sealed by registered engineers or architects properly licensed to perform such design and/or calculation Work within the State of Arizona.

There is no cost to Contractor for plan reviews by the City's Engineering Department and/or Building Safety Division or for the resultant building permit(s). Deferred submittals and the requirements of this section shall be at no additional cost to City.

30. BUILDING PERMIT: NOT USED

An approved, "no cost" building permit is available for this project from the City of Mesa Building Safety Division. The building permit number is _____. The Contractor is responsible to pick-up the permit, to comply with the conditions thereof and to schedule the required inspections by the Building Safety Division. These responsibilities shall be fully discharged by the Contractor at no additional cost to the City. The inspections by the Building Safety Division are separate and distinct from the project inspections by the City Inspector. The Contractor shall be responsible for arranging for both types of inspections.

31. SPECIAL INSPECTIONS: NOT USED

Special inspections of the Project Work are required, as required in Section 1701 of the International Building Code and as a noted condition of approval of the building permit for this Project. City or its representative will provide Special Inspections services for this Project. Contractor shall be aware of the required Special Inspections and shall coordinate with the City Inspector a minimum of two (2) business days in advance of any Work that will require a Special Inspection(s) relative to the required timing of the Special Inspections. It is Contractor's responsibility to ensure that all Work requiring Special Inspections remains uncovered and available for inspection until the Special Inspections are performed. Items covered prior to the performance of Special Inspections will be subject to uncovering at Contractor's expense.

32. CONSTRUCTION WASTE AND DEBRIS DISPOSAL: NOT USED

For the purposes of this section only, construction waste and debris shall be divided into two categories, which shall be defined and managed as stated herein.

Category One – Category One construction waste and debris are those materials for which Contractor is solely responsible for storage, transport and disposal. Materials in this category include hazardous materials (as defined by state and federal laws and regulations), asbestos-containing materials, lead-containing materials, PCB-containing materials, vegetation/plant materials, and earthen materials (including soil, rock, boulders, caliche, etc.). Under the direction of the City Inspector, Contractor shall be solely responsible for onsite storage, offsite removal, transport, and ultimate disposal of all Category One materials in full compliance with all local, state and federal laws and regulations. Any materials classified as a hazardous waste must be stored in proper containers, properly labeled, and documented on hazardous waste manifest. That manifest must be signed by a Resource Conservation and Recovery Act (RCRA) certified City employee before being shipped off site. The Contractor is responsible for identifying such materials, conducting any required testing of such materials, and providing a copy of the hazardous waste manifest to the City after having reached the final treatment, storage, or disposal facility. The cost of managing, storing, transporting, and disposing of Category One materials is a non-pay item.

Category Two – Category Two materials are all other construction waste and debris materials generated by the Project that can be legally disposed of in a landfill that accepts clean construction debris and/or general, non-hazardous household wastes. **Contractor must utilize City of Mesa Solid Waste services for all Category Two materials.** Contractor shall be responsible to coordinate with City Solid Waste Division to obtain and set the roll-off containers onsite. City may (at City's sole discretion) provide separate roll-off containers for different classifications of Category Two materials. For example, City may provide separate containers for metals, cardboard, plastic, "inert materials," and/or other classifications of materials. For the purpose of this section, "inert materials" are defined as the following:

> clean concrete, clean asphaltic pavement, cement block, clay brick, other masonry, clean stucco (no metal), clay or cementitious roof tiles, and other City-approved cementitious materials

After the containers have been filled, City will haul off and dispose of Category Two materials that are properly sorted and placed in the roll-off containers. Contractor shall be responsible for roll-off charges including set fee, haul fee, disposal fee and other applicable fees. Contractor shall also be held responsible for any improper sorting of Category Two materials (e.g., placing prohibited materials in the roll-off containers or improperly sorting materials), including the responsibility for corrective action (e.g., re-sorting the material) at no additional cost to City. Contractor must contact the Solid Waste Division at 480-644-6789 for specific questions or to initiate service for Category Two materials.

At the completion of construction, Contractor shall be responsible for the Project Site being cleaned of any debris or spoil resulting from construction, including the removal of all storage and roll-off containers.

For projects outside of City limits, Contractor is responsible for coordinating these services with waste disposal providers in the area.

Payment for Waste and Debris Disposal shall be per the "Construction Waste and Debris Disposal" item in the bid proposal.

33. PROGRESS MEETINGS:

At a time designated by the Engineering Department a Weekly Progress Meeting will be held at the job site. Contractor, together with representatives of their major Subcontractors, shall attend, as will other City Representatives. Contractor shall be responsible for notifying the Subcontractors of their required attendance and for conducting each meeting. The purpose of these meetings is to discuss the job progress, and to resolve any problems that may have developed since the last meeting. Verbal authorizations or acknowledgements by anyone present shall not be binding; only written authorizations as required under the Contract Document shall be effective.

34. PROGRESS REPORT:

For Work over 60 days Contractor shall submit monthly an updated Progress Report indicating Work completed during the preceding month and indicate any revisions to the Construction Progress Schedule. Contractor shall also submit the Progress Report with the Request for Payment.

35. PROGRESS CHART:

For Work over 60 days Contractor shall submit a graphic Progress Chart to City in a format acceptable to City. Contractor shall adjust the progress chart each month to graphically exhibit the status of each phase of the Work, corrected to show any differentials in starting and completion dates included in the original chart.

36. CLEANING: NOT USED

PART 1 – GENERAL

A. Work Specified Herein

This section outlines requirements for cleaning of the Project. This section is complementary to the MAG Specifications, Project Specific Provisions, and Specifications and nothing herein shall be considered to waive any requirements of those documents.

B. Requirements of Regulatory Agencies Contractor shall:

Safety and Insurance Standards:
Maintain Project in accordance with the following safety and insurance standards.

- State Industrial Commission (or Arizona)
- OSHA

Fire Protection:
Store volatile waste in covered metal containers, and remove from premises daily.

Pollution Control:
Conduct clean-up and disposal operations to comply with local ordinances and anti-pollution laws. Burning or burying of rubbish and waste material on the Project Site is not permitted. Disposal of volatile fluid waste (such as mineral spirits, oil or paint thinner) in storm or sanitary sewer systems or into streams or waterways is not permitted.

PART 2 – PRODUCTS – CLEANING MATERIAL Contractor shall:

Use only cleaning materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 – EXECUTION Contractor shall:

A. During Construction

- During the Construction Period, ensure that the material to be used in the Work shall be kept in an Orderly manner, neatly stacked or piled.
- Clean up frequently (at least weekly) all refuse, rubbish scrap materials, and debris caused by operations, to the end that at all times the site of the Work shall present a neat, Orderly and Workmanlike appearance. Sprinkle dusty debris with water.
- Provide for the disposal of all waste products, trash, debris, etc., and make necessary arrangement for legal disposal of same off the site. Never throw rubbish from windows or other parts of building. Lower waste materials in a controlled manner with as few handlings as possible.
- Remove all surplus material, false-Work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from operations and put the site in a neat, Orderly condition.

- Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for acceptance.
- Schedule cleaning operation so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- Provide trash gondolas or containers for use by all trades.

B. Final Cleaning

- Use experienced Workmen, or professional cleaners for final cleaning.
- Besides general broom cleaning, do the following special cleaning for all trades at completion of Work:
- Remove putty stains from glass; wash, polish same, inside and outside. Exercise care not to scratch glass.
- Remove marks, stains, fingerprints, other soil, and dirt from painted, decorated, or stained Work.
- Clean, polish and wax woodwork.
- Clean and polish hardware for removal of stains, dust, dirt, paint and the like.
- Remove spots, soil, paint from tile and similar Work; wash same.
- Clean fixtures, equipment; remove stains, paint, dirt, and dust.
- Remove temporary floor protections.
- Clean and polish all floors.
- Remove all temporary protections at the site.
- Clean exterior and interior metal surfaces, including doors and windows, of oil, stains, dust, dirt, paint and the like.
- Clean and vacuum all carpeted areas.
- Make buildings ready for occupancy in all respects. Lay heavy building paper in main circulation areas to protect the floors until final inspection and acceptance.

All existing improvements, inside or outside the property which are disturbed, damaged or destroyed by the Work under the Contract shall be restored to the condition in which they originally were, or to the satisfaction of City.

37. APPROVED APPLICATORS:

Where specific instructions in these specifications require that a particular product and/or material(s) be installed and/or applied by an approved applicator of the manufacturer, it shall be Contractor's responsibility to ensure that any Subcontractors used for such Work be approved applicators.

38. CHEMICAL USAGE IN THE BUILDING: NOT USED

Contractor shall submit material safety data sheets (MSDS) to City for all chemicals and products to be used in the building. All MSDS's shall be provided to the City Inspector at least one week prior to the scheduled use of the

material. Contractor, Subcontractor, and the City Inspector will hold a meeting to review the MSDS prior to the material application.

Unless otherwise directed by the City Inspector, chemical usage in the building (including such things as paint, adhesives, cleaners, etc.) shall be limited to those chemicals specially mentioned in the Project documents. Contractor shall obtain permission from the City Inspector prior to using any other chemical or cleaner in the building. For such materials, Contractor shall submit a copy of MSDS and a sample of the material to the City Inspector. The MSDS shall include information about the anticipated "volatile organic compound" (VOC) emissions from the material or Contractor shall provide said VOC information to City from other manufacturer-provided data. Materials with offensive or excessive odors or emissions or other unacceptable properties (*e.g.,* containing hazardous substances), as judged solely by the City Inspector, will not be approved for use on this Project and Contractor shall use an approved alternative material at no additional cost to City.

39. WATERTIGHT-WEATHERTIGHT: NOT USED

Anything in the Contract Documents notwithstanding, Contractor accepts the responsibility of constructing a watertight, weathertight Project.

40. HEATING: NOT USED

Should it become necessary to do any Work in the building, such as plastering, cement Work, painting, etc., at times when the temperature is below 40 degrees F., Contractor shall provide temporary heat for such length of time as deemed necessary by the Design Professional for the protection of the Work, and pay all expenses for temporary apparatus, its installation, proper maintenance and operation and for fuel.

Should temporary heat be required after permanent heating system is installed and operating, this unit may be used; however, Contractor shall pay all fuel costs and be responsible for proper operation of all heating units or systems.

41. TEMPORARY FIELD OFFICES: NOT USED

For this Project, Contractor shall provide a temporary field office trailer for City's use and a separate temporary field office trailer for Contractor's use. This section sets forth the minimum requirements for these two facilities. Said temporary field office shall be provided at no additional cost to City, the cost of which shall be distributed across other appropriate bid items.

Temporary Field Office for City's Use

Contractor shall furnish and install for City's use a separate office trailer located onsite and equipped with lighting, 110-volt electricity, heating, cooling, cold water, wastewater service, furniture, security bars, exterior locks, and tile flooring. Said trailer and shall be available for City's use for the duration of the Project. At City's sole discretion, City may elect to allow joint use of said facility with the Design Architect or Engineer, or the testing firm or construction administration firm hired by City. At the completion of the Project, Contractor shall remove the trailer from the site and restore the site.

The temporary field office provided by Contractor for City's use with its associated furnishings and equipment shall meet the following minimum specifications:

1) Size:
   Minimum of 10' x 30' with two entries equipped with stairs

2) HVAC, lighting and power:
   Provide a heating system capable of maintaining a uniform indoor temperature of 68 degrees Fahrenheit, and an air conditioning system capable of maintaining an indoor temperature of 76 degrees Fahrenheit. Provide light fixtures capable of maintaining average illumination

throughout the trailer of 20 foot-candles at desk height at all times. Provide 110-120 volt duplex outlets spaced at not more than 12 foot intervals.

3) Rooms:
Provide two offices, a toilet room, and a meeting room for four people.

4) Required furnishings:
Provide two 30" x 60" desks, two desk chairs, two plan racks, one plan table, one four-drawer filing cabinet, one two-door steel storage cabinet, one marker board, four-person conference table, four side chairs, and two sets of shelves each approximately 6' long x 4' high x a minimum of 12" deep with three shelves spaced at least 16" apart.

5) Required equipment:
Provide 1 each of the following – small refrigerator, microwave oven, bottled drinking water dispenser with hot and cold taps, high speed collating photocopy machine, and programmable fax machine.

6) Telephone service:
Provide two telephone lines and a separate fax line. Provide two telephones, each equipped with an answering machine.

7) Internet connection:
Provide one internet connection equal to or greater than 256K DSL connection.

8) Security and keys:
Provide interior blinds and security grills on all exterior windows. Provide three sets of keys to City to operate exterior entrance locks.

9) Provide weekly cleaning service for the duration of the Project.

Temporary Field Office for Contractor's Use and for Project Meetings:

Contractor will be required to provide a separate temporary field office trailer onsite for the duration of the Project for Contractor's use. Said trailer shall be separate from the trailer provided for City's use. The Project Superintendent's office shall be located in Contractor's trailer. Within said trailer, Contractor shall provide a room where Project meetings with City and others can be held. The room shall be at least 300 square feet in size with a conference table, 20 chairs, tack board at least six square feet in size, and a large white board. The room shall be equipped with HVAC, lighting and power meeting the same specifications as City's trailer specified above.

42. NOTIFICATION REQUIREMENTS TO PARTIES AFFECTED BY THE WORK: NOT USED

Contractor shall notify the adjacent property owners, businesses, tenants, City of Mesa Departments which may be affected by this Project (such as sanitation, police, fire department, etc.), the Mesa School District and any other parties which may be affected by this Project in writing and shall distribute the notice at least 48-hours prior to, but no earlier than one (1) week prior to, doing any Work on or in front of any driveway, performing Work on or removing any Concrete Masonry Unit (CMU) walls, fences or landscape screens, or enacting any street restrictions that will affect access to their property. Notification letters shall be reviewed and approved by the City of Mesa Engineering Public Relations Office at 480-644-3800 prior to distribution to the public.

The notification shall be for the purpose of allowing the referenced parties to relocate vehicle, reschedule routes, etc. as required, prior to construction and should specify the length of time the wall will be down or the driveway and/or street will be out of service. Alternate access shall be provided as directed by the City Inspector at no additional cost to City. If there are any delays in the construction, property owners shall be re-notified.

The notice shall include a description of the Work proposed, the timing and duration of Work impacting the property, Contractor's name, and the name and phone number of Contractor's contact person. The notice shall also include

the name of the City's Engineering Public Relations representative and give the City of Mesa Engineering Public Relation's phone number (480-644-3800).

Contractor shall be prepared to answer questions from the property owner about how Contractor will handle modifications to existing improvements such as landscaping, sprinkler irrigation, walls, fences, driveways, etc.

Compliance with the requirements of this section shall be at no additional cost to City.

43. CONTRACTOR ACCESS TO PRIVATE PROPERTY: NOT USED

Contractor shall not access private property to execute the Work unless temporary construction easement(s) or other access agreements(s) have been obtained prior to construction. Temporary construction easements or other easements acquired by City are shown on the Plans or are identified in the Specifications. All other Temporary Construction Easements and/or access agreements needed to execute the Work shall be acquired by Contractor prior to construction. Contractor shall provide City copies of any Temporary Construction Easements (TCE) and/or access agreements acquired by Contractor prior to construction. No other access to private properties is allowed.

44. EXISTING IMPROVEMENTS ON PRIVATE PROPERTY: NOT USED

Contractor will be required to Work on private property that has existing landscape and irrigation. Temporary Construction Easements (TCE's) have been obtained for this Work as shown on the Approved Plans. Contractor shall not disturb existing landscaping, turf, trees, shrubs, plants or irrigation on private property unless otherwise noted on Plans. In areas where new construction is shown on the Plans on private property, Contractor shall limit his Work to the minimum area needed to perform the new construction and shall NOT indiscriminately disturb existing landscaping or other improvements within the TCE. Areas or improvements on private property that are damaged shall be restored by Contractor to pre-existing conditions. All repair and restoration Work shall be done in accordance with the section herein titled, "Restoration of Existing Landscape and Landscape Irrigation".

45. RESTORATION OF EXISTING LANDSCAPE AND LANDSCAPE IRRIGATION: NOT USED

Contractor will be required to remove and restore existing landscape and landscape irrigation that is disturbed by this Project. Said landscape and landscape irrigation shall be replaced in-kind and repaired to the satisfaction of the private property owner (if applicable) and the City Inspector. All repairs and restoration shall be performed by a registered Landscape Contractor who is properly licensed with the State of Arizona. Existing conditions defined herein shall include, but not be limited to, plants, pavestones, decorative boulders, rock, gravel, masonry walls, driveways, concrete borders, planters, electrical lines, lighting, underground sprinkler systems and other landscape materials.

Where the new street right-of-way line (ROW) has been re-aligned through existing private property, Contractor shall modify and restore the private landscape irrigation system from the back of new sidewalk to the limits of the disturbed landscaped areas.

Contractor shall provide and install all piping, plumbing, mounting hardware, fittings, connections, conduit, electrical equipment, junction boxes, valve boxes, covers, plates, sprinkler heads, emitters, and all other equipment, materials and labor as required to complete the Work in a Workmanlike manner and suitable for the purpose for which it was intended. All irrigation systems (i.e., sprinkler heads, bubblers, emitters, controls, etc.) serving an area affected by this Project shall be restored as required to facilitate the continued operation for their intended use.

All equipment and materials damaged during construction shall be removed and disposed of and new equipment and materials installed in its place. New equipment and materials shall be of the same type and manufacturer as the items to be replaced and shall provide equal performance. New sprinkler heads shall have the same precipitation output as the existing lawn heads to remain. All piping, pipe fittings, couplings, sprinklers, emitters, conduit, sleeving, low voltage control conductors, service line conductors, drip line, fixtures, etc. used in the repair and restoration of existing sprinkler and emitter systems shall be new, in perfect condition, and shall comply with MAG Specification Section 757.

All sprinkler heads in existing lawn areas in the path of the new construction shall be removed and relocated as required to provide complete coverage of the lawn area without overspray on sidewalks and walls. If the trees and plants being removed are served with drip irrigation or bubblers, said irrigation system shall be modified to eliminate the irrigation serving the removed tree and/or plant locations such that the remaining system remain in good Working Order to serve all other trees and/or plant materials.

All existing backflow prevention units, controllers, and irrigation control valves in the path of new construction shall be relocated into existing landscaped areas within Temporary Construction Easements away from proposed utilities and underground electrical lines. Completely remove the entire assembly and all accessories and connections leaving the entire space free from exposed parts. Provide and install all piping, plumbing apparatus, mounting hardware, fittings, connections, conduit, electrical apparatus, junction boxes, valve boxes, covers, plates, etc. as required to complete the Work in a Workmanlike manner and suitable for the purpose for which it was intended. All equipment damaged during relocation shall be removed and disposed of and new equipment installed in its place. New equipment shall be of the same type and manufacturer as the equipment to be replaced and provide equal performance and the new construction shall be in accordance with City of Mesa's Standard Details for landscape irrigation system backflow prevention devices.

Where decorative surface gravel or rock exists, Contractor shall remove existing gravel or rock away from the area to be disturbed and away from the area where excavated material will be placed. Any existing plastic under gravel or rock shall be pulled back or removed. The trenches shall be backfilled and compacted to 90% (minimum) of maximum density. After backfilling, the plastic shall be pulled back into place or replaced with 3-mil (minimum thickness) black plastic and the rock or gravel put back into place on top of the plastic. Contractor shall augment the rock or gravel with matched material, as necessary to cover/hide the plastic and underlying soil.

Protection and restoration of property and landscaping shall comply with MAG Specification Sections 107.9, 107.10 and 107.11. Unless otherwise noted on the Plans, all replacement plants, trees and shrubs shall be of the same species and equivalent size as the plant, tree or shrub being replaced, as determined by City Inspector. Notwithstanding said requirement, the minimum tree size shall be 24-inch box and the minimum shrub size shall be 5-gallon.

Restoration Work shall include rough and fine grading, placement of decomposed granite, planting and staking of plant materials, restoration of turf areas, etc. Unless otherwise stated on the Approved Plans, turf area shall be re-established and restored by re-seeding.

Contractor shall be required to provide a temporary water source to the vegetation (including hand watering, if necessary) until the landscape irrigation system is restored to full function at no additional cost to City.

Unless otherwise determined by the City Inspector, Contractor shall complete all repairs and/or restoration Work on damaged or disturbed landscape irrigation systems and damaged electrical lines and lighting within 24-hours of such damage or disruption.

For each parcel, unless otherwise determined by the City Inspector, Contractor shall complete repairs and restoration Work on landscaping within one week after completion of Project Work on that parcel. In addition, the total duration of Project (including disturbances to the landscape and landscape irrigation) on any one parcel shall not exceed 60 days, unless otherwise approved by the City Inspector.

Compliance with the provisions of this section shall be at no additional cost to City of Mesa.

46. RELEASE FORM FOR DISTURBANCES TO PRIVATE PROPERTY: NOT USED

Contractor shall provide all property owners whose private property is disturbed by the Project Work and/or related activities (referred to hereafter as "Project Work") with a copy of the attached Release Form.

In addition, if there are existing "qualifying improvements" within the public right-of-way (*i.e.*, not on private property) that are disturbed by the Work, Contractor shall provide the owner of the immediately adjacent private parcel with

a copy of the attached Release Form. "Qualifying Improvements" shall include landscaping, landscape irrigation, residential driveways, business access drives/driveways, monument signs, privately-owned signage, business parking lot improvements, and other items (as judged solely by the City Inspector) that the adjacent property owner installed, constructed and/or maintains. "Qualifying improvements" shall not include public street improvements, or public utility lines.

The Release Form shall be used to address restoration of existing improvements on private property and restoration of "qualifying improvements" in public right-of-way and/or easements.

City will withhold 10% of the total payment for restoration of existing improvements on private property and restoration of "qualifying improvements" in public right-of-way and/or easements until Contractor has provided copies of all signed Release Forms to the City Inspector.

47. CITIZEN COMPLAINT RESOLUTION:

Contractor shall respond to all customer/citizen calls or complaints resulting directly or indirectly from this Project within two hours of receipt and shall resolve any issues within 48 hours. Contractor shall keep the City Inspector and Engineering Public Relations Representative aware of all such calls and complaints within 24-hours of receipt and their resolution.

Compliance with the requirements of this section shall be at no additional cost to City.

48. BUSINESS ACCESS: NOT USED

Business access signs (COM Detail M-24) and driveway access shall be provided for all businesses that are impacted by this construction, including impacts by traffic controls and restrictions. For each business access sign, the City of Mesa Inspector may also require the Contractor to provide and install a personalized business access sign (COM Detail M-24.01 or M-24.02). Additionally, the contractor shall ensure that these access points are properly sized, swept and/or graded to provide a safe and smooth riding surface as required by the City of Mesa Inspector.

49. WATER SYSTEM SHUTDOWN: NOT USED

Contractor shall notify property owners and tenants in writing 48 hours in advance of any interruption in water service. The City Engineering Public Relations Representative at 480-644-3800 shall approve the notification letters prior to distribution.

Unless otherwise approved by the City Inspector, water service shall not be interrupted for more than a period of four (4) consecutive hours, and not more than once per 24-hour period.

50. HAZARDOUS LOCATIONS: NOT USED

The existing and any proposed wastewater (sewer) structures (including lift stations, diversion structures and manholes) shall be treated as hazardous locations. They are confined spaces and may have explosive and/or asphyxiating concentrations of methane gas, hydrogen sulfide gas, and/or other gases or vapors. All Work shall be conducted in a safe and cautious manner consistent with the potential hazardous conditions. The Contractor shall be responsible to comply with all local, state, and federal laws and regulations that govern Work in such environments.

In Work operations in hazardous locations, spark-proof tools and explosion-proof temporary lighting shall be used. Electric power tools, open flame heaters, electric welding equipment, or other devices or methods that might conceivably cause ignition or explosion shall not be used. Welding Work is permitted provided all safety precautions and measures (in full compliance with all applicable federal, state and local laws and regulations) are practiced in conjunction with obtaining a Hot Work permit for the extent and duration of said welding Work.

The Work shall include sampling the atmosphere for hazardous gases and vapors. If the atmosphere proves unsafe, Contractor shall provide a safe Working atmosphere at no additional cost to City. The atmosphere shall be continually monitored during the Work period.

Smoking in or near the Work Area shall not be permitted. Suitable, prominent "No Smoking" signs shall be posted.

Contractor shall have a written policy and an active program for Confined Space Entry that complies with federal, state, and local laws and regulations. Contractor shall submit his/her policy and program, as a required Shop Drawing Submittal.

The City Inspector may have need to enter the manhole under Contractor's safety program to perform observations and/or testing. Contractor shall provide the necessary safety equipment, monitoring and safe Working atmosphere to allow the City Inspector to safely enter the manhole, at no additional cost to City. The City Inspector will provide Contractor with evidence of current Confined Space training.

Contractor is responsible for safety of the job site, including the responsibility to enforce and enact the provisions of Contractor's Confined Space Entry Program and the responsibilities to monitor the atmosphere within the structures and provide a safe Working atmosphere and environment. These safety measures shall be at no additional cost to City. City shall not be responsible for safety or for safety monitoring of the job site.

51. PROJECT IDENTIFICATION SIGN – TYPE 1: NOT USED

Unless otherwise determined by the City Inspector, Contractor shall install a Project identification sign(s), as specified herein, a minimum of one week prior to the start of construction. Unless otherwise directed by the City Inspector, for street Projects and similar "horizontal Work" Projects, the Project identification signs shall be placed at both ends of the Project. Unless otherwise directed by the City Inspector, for "vertical" construction Projects, one Project identification sign shall be placed at the main construction entrance to the site. Contractor shall obtain City Inspector approval for the proposed location(s) of the signs prior to installing them.

City has contracted with a sign company to provide the Project identification signs for City of Mesa Projects. The Contractor shall coordinate order and delivery of said signs with the City of Mesa Engineering Public Relations Representative at 480-644-3800. City will provide the sign(s) for the Project to Contractor at no cost to Contractor. Creation of the signs is estimated to take up to fourteen (14) calendar days. Contractor shall allow sufficient time in the Project Schedule for this activity.

Unless otherwise approved by the City Inspector, each sign shall be mounted either by rigid timber posts or a flexible system able to accommodate the size and weight of the sign. Rigid posts shall be two 4" x 6" timber posts and embedded in the ground. The flexible stand shall be windmaster or approved equal. Both mountings shall be provided by Contractor at no cost to City.

52. PROJECT IDENTIFICATION SIGN – TYPE 2: NOT USED

Unless otherwise directed by the City Inspector, one Project identification sign (as specified herein) shall be placed at each end of the Project Work area on each street. Contractor shall obtain City Inspector approval for the proposed locations of the signs prior to placing them. For each street segment, unless otherwise approved, the signs shall be in-place a minimum of one week prior to the beginning of construction on that street segment and shall remain in place until construction is completed and approved on that street segment. When all Work on a given street segment is complete as determined by the City Inspector, the sign for that street segment may be relocated elsewhere within the Project Site.

Contractor-provided signs shall be 4' x 4' in size. Each sign shall have the following information:

OFFICIAL PROJECT NAME

CITY OF MESA PROJECT NO. (FILL IN THE CORRECT INFO)

(DATE) mm/dd/yy TO (DATE) mm/dd/yy

FOR MORE INFORMATION, CALL (480) 644-3800

The letters shall be a minimum of 4-inches high. Lettering shall be black on a construction orange background. Sign material shall be reflectorized and shall be post mounted or on moveable bases, or as approved by the City Inspector.

The City of Mesa's Engineering Public Relations office (480-644-3800) shall review and approve the sign layout and verbiage before Contractor will be permitted to make the signs.

Compliance with the requirements of this section shall be at no additional cost to City.

53. RESPONSIBILITY FOR CABLING AND WIRING: NOT USED

City will provide and install the cabling and wiring for the following building systems for this Project.

- Radio communications

Said materials and labor provided by City shall not be included in the Contract Price. City will perform said labor with its own forces or by Contracting with outside third parties. This Work by City and/or its representatives will occur during the construction Contract for this Project.

Contract shall grant City or its representative's access to the building throughout the construction period so that City or its representatives can install the indicated cabling and wiring. Contractor and City shall coordinate schedules to avoid conflicting Working conditions and to avoid installation of conduits or wiring in conduit that is scheduled for disruptions or removal.

Unless otherwise noted in Contract Documents, the cabling and wiring for the following building systems included in this Project will be by Contractor, the cost of which shall be included in the Contract Price(s):

- Data
- Telephones
- Fire Alarm
- Cable television (CATV)
- Alert/dispatch system (for fire stations)
- Closed circuit television (CCTV)
- Security and access control system

54. SECURITY REQUIREMENTS:

Special security requirements apply to this Project as outlined in this section. The following noted/checked City of Mesa Security Level shall apply to this Project (levels that are not checked do not apply). **Requirements are detailed for each of the security levels in Attachment B** attached to these Project Specific Provisions and in the remainder of this section.

☐ Level 0: (Use Attachment B.0)
☒ Level 1: (Use Attachment B.1)
☐ Level 2: (Use Attachment B.2)
☐ Level 3 Escorted: (Use Attachment B.3a)

The required forms are included in security forms identified at the end of each Attachment (B.0 – B.3b). The "Contractor Verification Form" is to be used with all levels. The "Background Authorization" form is to be used with Level 1, 2 or 3 in accordance with project site security requirements. In lieu of completing the "Background Authorization" form, a contractor can provide a valid Arizona Department of Public Safety (DPS) Identity Verified Prints (IVP) Clearance Card for level 1 or 2.

Every person requiring access to the Project site shall be required to obtain clearance to access the site per the procedures discussed in Attachment B (following the procedures outlined for the appropriate Project security level). Access to the site will not be permitted until clearance is granted by City. These processes can be lengthy (as detailed in Attachment B). Contractor shall allow sufficient time for these processes.

If any individuals are not permitted access to the site (as determined solely by City), Contractor shall promptly submit the information required for replacement individuals (following the same procedures outlined above) and allow time for City review and background check per Attachment B. No additional cost or claims will be paid to Contractor related to individuals who are not permitted access to the site.

Subsequent to the start of the Project, if personnel changes occur, Contractor shall submit the required information for replacement individuals. Said information shall be submitted with proper lead time corresponding to the replacement person's need for access to the site.

Except as otherwise specifically noted, compliance with the provisions of this "Security Requirements" section shall be a non-pay item.

Photo Identification Badges

Everyone requiring access to the site shall obtain and wear at all times while onsite a City of Mesa-issued photo identification badge. City of Mesa will provide the photo ID badges (at no cost to Contractor) only to those individuals who have passed the background check.

After Contractor has received notification from City that an individual has passed the background check, Contractor shall have that individual report to the Badging office at 340 E. Sixth Street to obtain their photo badge. Contractor is advised to call 480-644-5113 prior to having anyone report to the office to ascertain the latest hours and days of operation for the Badging office.

The photo badges remain the property to City of Mesa and final payment to Contractor will not be made until the photo ID badges are returned to City.

Safety Vests

All individuals shall wear brightly colored safety vests at all times they are onsite to identify them as members of the construction crew. The vests remain the property of Contractor.

55. STAGING AREA AND USE OF THE SITE:

Contractor may use a portion of the site as a staging area, as shown on the coversheet of the Approved Plans. The area available to Contractor's for staging and storage is limited to the area shown on said plan sheet. If Contractor requires additional storage or staging area, they shall be solely responsible to provide it at an off-site location at its own expense.

Unless otherwise approved by the City Inspector, all equipment and stored materials left onsite when Contractor is not onsite shall be secured in said staging area. Contractor shall be responsible for the security of the Project Site and the staging area. At a minimum, the staging area shall be enclosed by a 6-foot (minimum) height temporary chain link fence with barbed security top and with lockable gates.

Contractor shall confine their Work, materials storage, and activities at the site to the designated staging area, plus the areas noted for construction on the Approved Plans. Contractor shall not unreasonably encumber the site, as determined solely by the City Inspector, with materials or equipment.

Unless otherwise approved by the City Inspector, equipment and material not actively being used to prosecute the Work shall not be stored in the right-of-way.

56. NO STAGING AREA PROVIDED: NOT USED

City has made no provisions for a staging area for this Project. If Contractor requires or desires a staging area, they shall make their own arrangements for a staging area. City will not be party to said arrangements or agreements with outside parties for a staging area. The City does, however require a copy of any lease agreements (or similar documents) for project staging areas. Responsibility for the staging area shall be solely Contractor's. City shall bear no responsibility for the security or condition of the staging area during or after the Project. The staging area (if provided) shall be at no additional cost to City.

57. LOCATE/VERIFY EXISTING SEWER SERVICE LATERAL CROSSINGS: NOT USED

On all properties that will have a new gas service line installed, Contractor shall be required to locate the existing sewer service line from the existing sewer main to the home/business prior to installing the gas service line. If (after locating the existing sewer service line) the proposed gas service line will be located within 24-inches (vertically or horizontally) from the existing sewer service line, the Contractor shall be required to verify the gas service line has not encroached on the existing sewer service line using one of the following options as approved by the City of Mesa Gas Inspector:

A. If the proposed gas service line will be installed parallel to the existing sewer service line but will not cross the existing sewer service line, the Contractor shall expose the existing sewer service line at 10-foot intervals or at least three (3) separate locations (which ever results in the greater number of locations) along the encroachment to ensure the proposed gas service line maintains a minimum separation of 12-inches between the gas service line and the existing sewer service line.

B. If the proposed gas service line crosses the existing sewer service line, the Contractor shall expose the existing sewer service line at the point it crosses to ensure there is a minimum separation of 12-inches between the proposed gas service line and the existing sewer service line.

C. In the event an existing sewer service is not able to be located and with the approval of the City of Mesa Gas Inspector, the Contractor may proceed with the installation of the gas service line in one of the following final manners:

    1. Install the gas service line per the approved plans and video the existing sewer service from the sewer main in the street to as close to the house/building as possible to ensure the new gas service line does not encroach on the existing sewer service line.

    2. Install the gas service line in the location called out in the approved plans using open-cut trenching.

The Contractor shall be responsible for repairing any damage incurred to the existing sewer service line when installing the new gas service line at no additional cost to the City.

The Contractor may also use open cut installation of the gas service line in lieu of boring if horizontal or vertical separation of less than 24-inches will exist. Open cutting may be used only as directed and approved by the City of Mesa Gas Inspector and shall not be used as the normal means of installation of gas service lines.

The Contractor shall coordinate work with the Gas System Inspector to complete a Sewer Lateral Inspection Report (Attachment C) for each address where a new gas service line is installed. In addition, the Contractor shall provide the City of Mesa Gas Inspector an MP4 video of each sewer service line as required in C.1 above to be videoed with the service address clearly identified on the video. The Contractor shall include costs for locating/verifying the existing sewer service lines (in accordance with this Section) in the bid item titled "Locate/Verify Existing Sewer Service Lateral." Payment will be "per each" sewer service line thus located.

58. VIDEO EXISTING SEWER SERVICE LATERAL CROSSINGS: NOT USED

On all properties that will have a new gas service line installed, Contractor shall video camera existing sewer service laterals after installing the gas service line. Contractor shall video all sewer service lines from the sewer main in the street to as close to the house/building as possible as determined by the City of Mesa Gas Inspector. If Contractor is unable to video the exiting sewer service line, Contractor shall notify the City of Mesa Gas Inspector for approval to verify minimum clearance requirements by other electronic locating means. Contractor shall complete a Sewer Lateral Inspection Report (attached as Attachment "C") for each address where a new gas service line is installed. In addition, Contractor shall provide the City of Mesa Gas Inspector a Digital Video DVD of each sewer service line videoed with the service address clearly identified on the video.

Contractor shall include its costs for videoing the existing sewer service lines in the Contract Price.

59. UTILITY CROSSINGS USING BORING METHODS: NOT USED

Refer to Engineering Department Policy Statement posted on the City's Engineering Website: http://www.mesaaz.gov/home/showdocument?id=11779.

60. ASBESTOS INSPECTIONS: NOT USED

An inspection of this facility has been conducted by an Environmental Protection Agency certified Asbestos Hazard Emergency Response Act inspector(s). The results of that inspection are included in the Contract documents. The Contractor shall be provided a complete copy of this report and shall keep a copy of this report on-site during all demolition or renovation activities.

61. ASBESTOS-CONTAINING MATERIALS: NOT USED

This project is expected to potentially impact asbestos containing materials (ACM). ACM is any material that contains 1% or greater asbestos fibers. Only that ACM that will be disturbed as part of this project will be required to be abated. All ACM shall be managed in accordance with the City of Mesa Asbestos Abatement Procedures manual. A copy of the most recent version of that manual and a pre-job submittal review of content form is available at the following address: http://www.mesaaz.gov/home/showdocument?id=5078. All submittals required in this specification or in the manual referenced herein shall be submitted through the standard Shop Drawing submittal process.

Additional abatement may be necessary if additional materials not previously sampled are discovered during demolition/renovation activities. If the Contractor identifies a suspect material that was not included in the report prepared for this project, the City shall be contacted within one (1) hour of the discovery of the new material. The suspect material shall not be disturbed until further direction is received from the City. Newly identified materials may be sampled by the City to determine if they are ACM. The City will not pay for abatement of additional ACM unless they are reported and sampled as described herein.

62. NESHAP 10 DAY NOTIFICATION FOR DEMOLITION AND/OR RACM ABATEMENT: NOT USED

The Contractor is responsible for submittal of the National Emission Standards for Hazardous Air Pollutants (NESHAP) ten (10) day notification to the applicable regulatory agency for the demolition of any load-supporting structural member of a facility and/or abatement of threshold quantities of regulated asbestos containing material (RACM).

Copies of the NESHAP notification shall be submitted through the standard Shop Drawing submittal process. Copies of payment fees associated with NESHAP Notification shall be included with the submittals.

63. LEAD PAINT: NOT USED

An inspection of this facility has been conducted by an Environmental Protection Agency certified lead inspector(s) and/or a certified risk assessor. The results of that inspection are included in the contract documents.

This project is expected to impact lead-based paint (LBP) paint or other surface coatings. LBP contains lead equal to or in excess of 1.0 milligrams per square centimeter or more than 0.5 percent by weight (equivalent to 5,000 parts per million) as established by the U.S. Department of Housing and Urban Developmental and the U.S. Environmental Protection Agency. LBP, and/or the materials coated with LBP, is characterized as a Resource Conservation and Recovery (RCRA) hazardous waste if bulk sample analysis for lead using the Toxicity Characteristic Leaching Procedure (TCLP) exceeds 5.0 parts per million.

Only that LBP that will be disturbed as part of this project will be required to be abated. All LBP shall be managed in accordance with the City of Mesa Lead-Based Paint Abatement Procedures manual. A copy of the most recent version of that manual and a pre-job submittal review of content form is available at the following address: http://www.mesaaz.gov/home/showdocument?id=5088.

After the abatement is completed, appropriate waste disposal documentation shall be submitted to the City. Receipt of such shall be a condition for processing progress payments related to LBP abatement work. For LBP materials classified as a RCRA waste, the waste manifest must be signed by appropriately trained and certified City personnel prior to shipment from the point of generation.

64. DRYWELL INSTALLATION: NOT USED

This project involves the installation, upgrade, or removal of a drywell system(s). Drywells must be registered with the Arizona Department of Environmental Quality (ADEQ), except those used in conjunction with golf course maintenance activities.

Additionally, a permit under the ADEQ's Aquifer Protection Permit (APP) program is required for drywells draining areas where:

1. Hazardous materials are used, stored, or loaded;
2. Motor fuel dispensing operations occur;
3. Motor fuels are used, stored, or loaded; or
4. Vehicle and equipment washing occur.

The City is responsible for ensuring drywells are properly registered and permitted.

The Contractor shall be responsible for supplying the following information to the City after drywells have been constructed to ensure that drywells can be accurately registered, permitted, and properly maintained.

- Facility name;
- Facility address;
- Cadastral location [ie: Township, Range, Section (ie: section, ¼, ¼, ¼)];
- Site plan showing location of each drywell;
- Manufacturer and model of each drywell;
- Lat/Long coordinates (in NAD 1983) of the standpipe in each drywell
- As-built diagrams of the drywell (vertical profile) to include the following:
  - All chambers and manway accesses;
  - All subsurface inlets;
  - Total depth and diameter of borehole(s);
  - Total depth and diameter of each chamber;
  - Drainage pipe and screened sections;

- Depth, length and diameter of all connector pipes (where used);
- Base seal type (e.g. geotextile, poly liner or concrete slurry);
- Screens, shields, regulators, overflow pipes, etc.; and,
- All pollution controls;

- Driller's log(s).

Where a drywell is being removed, the Contractor shall do so in accordance with the ADEQ's Drywell Decommissioning Guidelines. The Contractor shall submit copies of the written verification to the City as well as to the ADEQ.

All costs associated with this requirement shall be included in the Contractor's pricing. The above listed project submittals shall be provided to the City. Receipt of such shall be a condition for processing progress payments related to drainage work conducted under this contract.

65. REMOVAL OF UNIDENTIFIED UNDERGROUND STORAGE TANKS (UST): NOT USED

In the event an underground storage tank (UST) system is discovered within the limits of this project, the Contractor shall immediately notify (within one hour of identification) the City Inspector. The UST system shall not be further disturbed until further direction is given from the City Inspector. If it is determined that petroleum contaminated soil is present as a result of the presence of the UST system, this shall be managed under the "Petroleum Contaminated Soil" project specification as outlined in these Project Specific Provisions.

The City will utilize the service of their Hazardous Materials Response Contractor and/or an Arizona Department of Environmental Quality (ADEQ) certified tank service provider to remove or properly abandon the UST system and remove any surrounding impacted soils at no additional expense to the Contractor. The City shall manage all aspects of the removal of the UST system including proper notification to regulatory agencies.

After the UST system and any impacted soils have been removed, the City will make arrangements with the Contractor through the change order process to backfill the excavated areas with compacted uncontaminated soil per MAG Specification Section 211. The Contractor shall make arrangements for obtaining imported borrow materials to meet the requirements as noted in MAG Specifications Sections 210 and 211. All backfill shall be compacted to a uniform density of not less than 95 percent.

66. REMOVAL OF SEPTIC SYSTEM: NOT USED

In the event a septic tank and/or leach field (septic system) is discovered within the limits of this project, the Contractor shall immediately notify (within one hour of identification) the City Inspector. The suspect materials shall not be further disturbed until further direction is given from the City Inspector. Suspect material may be sampled by the City to classify the type of waste stream that applies to the contents of the tank. If it is determined that petroleum contaminated soil is present as a result of the presence of the septic system, this shall be managed under the "Petroleum Contaminated Soil" specification as outlined in these Project Specific Provisions.

If the contents of the septic tank itself is a waste that requires specialized personnel to manage its removal (i.e. hazardous waste), the City will utilize the services of their Hazardous Materials Response Contractor to remove the contents of the tank itself, and any surrounding impacted soils at no additional expense to the Contractor. In this case, the City will manage all aspects of the removal of the septic system including proper notification to regulatory agencies.

If contents of the septic tank itself and any surrounding soils are a waste that does not require specialized personnel to manage its removal, the City will make arrangements with the Contractor through the change order process to remove the contents of the septic tank and to properly abandon the septic tank in accordance with the Maricopa County Health Code after providing proper notification to the Maricopa County Environmental Services Department.

In any case, after the septic tank and any impacted soils have been removed, the City will make arrangements with the Contractor through the change order process to backfill the excavated areas with compacted uncontaminated soil per MAG Specification Section 211. The Contractor shall make arrangements for obtaining imported borrow

materials to meet the requirements as noted in MAG Specifications Sections 210 and 211. All backfill shall be compacted to a uniform density of not less than 95 percent.

67. REMOVAL OF PETROLEUM CONTAMINATED SOIL (PCS):

In the event that petroleum contaminated soil (PCS) is discovered within the construction limits of this project, the Contractor shall immediately notify (within one hour of identification) the City Inspector. The suspect material shall not be further disturbed until further direction is given from the City Inspector. Suspect material may be sampled by the City to classify the type of waste stream that applies to the impacted soil. All PCS shall be protected from the elements at all times until removed from the site and disposed of at a landfill.

If it is determined that the removal of the PCS requires specially trained workers (HAZWOPER trained) to remove the soil, the City will use the services of its Hazardous Materials Response Contractor to remove the PCS at no additional expense to the Contractor.

If it is determined that the removal of the PCS does not require specially trained workers and the Contractor agrees, the City will make arrangements with the Contractor through the change order process to properly dispose of the PCS at a landfill that meets all the applicable state and federal guidelines for disposal of this type of waste stream. The Contractor shall supply copies of all waste disposal documentation for PCS removed by them. Receipt of such shall be a condition for processing progress payments related to the PCS excavation work.

In either case, after excavation is completed the City may sample the soils to confirm that all PCS has been removed. After the removal of all PCS has been confirmed, the City will make arrangements with the Contractor through the change order process to have the Contractor backfill the excavated areas with compacted imported soils per MAG Specification Section 211. The Contractor shall make arrangements for obtaining imported borrow materials to meet the requirements as noted in MAG Specifications Sections 210 and 211. All backfill shall be compacted to a uniform density of not less than 95 percent.

68. DISPOSAL OF EXISTING FLUORESCENT LIGHT BALLASTS AND BULBS: NOT USED

The Contractor shall remove all existing fluorescent light bulbs, including Compact Fluorescent Lamps (CFLs), and ballasts from the existing fluorescent light fixtures that are called out for demolition or removal. The Contractor shall carefully examine the ballasts to determine if they contain polychlorinated biphenols (PCBs). Ballasts that are not labeled as containing "no PCB's" shall be assumed to contain PCB's.

The Contractor shall safely store fluorescent light bulbs/CFLs, and PCB ballasts in properly labeled and approved containers until shipped offsite for disposal. Fluorescent light bulbs/CFLs that are either already broken or broken during or after removal shall be stored separately from those that are removed intact. The Contractor shall have a mercury spill clean-up kit on-site at all times during the removal of fluorescent light bulbs/CFLs and shall promptly clean up after any broken bulbs and CFLs.

PCB ballasts and broken fluorescent light bulbs/CFLs shall be shipped and disposed of as a Resource Conservation and Recovery Act (RCRA) hazardous waste. Intact fluorescent light bulbs shall be shipped and disposed of as a RCRA universal waste. Waste manifests or shipping papers from these waste streams must be signed by appropriately trained and certified City personnel prior to shipment from the point of generation.

69. USE OF CRANES IN VICINITY OF COMMUNICATION TOWERS: NOT USED

No cranes, booms, or equipment, at a height of 50-feet or more, can be located in or pass through the microwave dish transmission zone of communication towers.

70. SECURITY AND CONFIDENTIALITY PROTECTIONS:

Contractor acknowledges and agrees that its employees, subcontractors, and agents working on the Project who have access to, or information about, the Project need to protect this information from disclosure to persons other than City staff and persons working directly on the Project.

Contractor shall ensure that its workforce has received position-appropriate security training and awareness. This includes specialized training for those involved in the design, development, manufacture, testing, shipping, installation, operation, and maintenance of the Project, as part of the Contractor's security program, including cybersecurity.

Contractor shall ensure that policies and procedures are followed to prohibit the unauthorized disclosure of knowledge, information, architectures, or configuration relevant to the Project and the City's system.

71. SUPPLEMENTAL INSTRUCTIONS TO BIDDERS UNDER FEDERAL A.I.P. PROJECTS:

This project is being funded by grants from the Federal Aviation Administration (FAA) under the national Airport Improvement Program (A.I.P.), by the Arizona Department of Transportation, Multimodal Planning Division, Aeronautics Group (ADOT), and the City of Mesa; therefore, all bidders shall comply with the following federal requirements:

A. Federal Funds are being used to assist in the construction of this project and, accordingly, all applicable Federal laws, regulations, and orders must be complied with at all times. See **Exhibit C** of the Construction Services Contract for additional information.

B. The Bidder must supply all information required by the bidding documents and specifications.

C. No Bidder may withdraw his bid for a period of ninety (90) calendar days after the date set for the opening thereof.

D. Each Bidder must complete, sign, and submit with his bid: a "Non-Collusive Bidding Certification", a "Certification of Non-Segregated Facilities," a statement entitled "Bidder's Statement on Previous Contracts Subject to EEO Clause," an "Assurance of Disadvantaged Business Enterprise (DBE) Participation," a "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion," a "Certification Regarding Foreign Countries", a "Buy American Certificate", a "Certificate of Insurability", and a "List of Subcontractors…"; all as contained in the Contract Documents.

E. Each bidder, to be considered, must have the appropriate Contractor's license required under provisions of the ARS 32-1101 through 32-1170.03 for the work covered in his proposal when his bid is submitted. Each bidder shall provide their Contractor's License information in the spaces provided on the signature page of the Bid Proposal.

F. All bids will be tabulated. The City will then determine the lowest responsive and responsible bid, after considering the recommendations of the Engineer, and then forward the bids received to the Federal Aviation Administration (FAA) and the Arizona Department of Transportation (ADOT) with a recommendation that the Contract be awarded to the firm determined to be the lowest responsive and responsible bidder. After approval by the FAA and ADOT, and if awarded by the Mesa City Council, the City will enter into a contract with the Contractor for construction of the work.

G. As required under the Federal and State Grants, the City is required to collect and submit accurate project reporting data to the U.S. DOT, the U.S. Secretary of Labor, the FAA, and ADOT. It is a key requirement of this contract that the Contractor shall accurately complete and submit the required project documentation during each month that construction activities take place. Contractor's failure to maintain and submit accurate and timely progress reports, compliance reports, and other required project documentation with each request for progress payment, and/or request(s) for release of retainage, shall result in the Contractor's payment requests being returned without payment until they are complete.

H. Required project documentation includes, but is not limited to: Safety Plan Compliance Document, Certified Payrolls, Civil Rights Compliance Reports, DBE Utilization and Reporting Forms, Construction Management Plan, Quality Control Plan, Quality Control Materials and Testing Reports, and Weekly Construction Reports using *FAA Form 5370-1 Construction Progress and Inspection Report*. Additional information is contained in the General Provisions, and Technical Specifications.

I. Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (EEO) (Executive Order 11246, as amended). The attention of all Bidders is directed to the requirements for compliance with federal

laws regarding nondiscrimination, equal opportunity, and affirmative action as prescribed by Executive Order 11246 (as amended). See the *"Standard Federal Equal Employment Opportunity (EEO) Requirements for Construction Contracts"*, contained in **Exhibit C** of the Construction Services Contract for additional information.

J. All labor on the project shall be paid no less than the prevailing minimum wage rates established by the U.S. Secretary of Labor and contained in the specifications and shall comply with all provisions of the Davis-Bacon Act. A copy of the most current wage determination is contained in **Exhibit C** of the Construction Services Contract.

K. The prevailing wage and salary rates of pay, set forth in the contract documents and bound herein, are the minimums to be paid during the life of the Contract. It is therefore the responsibility of all bidders to inform themselves as to local labor conditions, such as the length of work day and work week, overtime compensation, health and welfare contributions, labor supply and prospective changes or adjustments of rates.

L. It shall be a condition of the Contract, and shall be made a condition of each subcontract entered into pursuant to the Contract, that the Contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health or safety, as determined under construction safety and health standards promulgated by the United States Secretary of Labor, in accordance with *Section 107 of the Contract Work Hours and Safety Standards Act (83 Stat. 96)*.

M. Each Bidder agrees to comply with the provisions of the State of Arizona Executive Order 75-5, (dated April 28, 1975) as amended by *Arizona Executive Order 99-4 (dated March 1, 1999)* relating to equal opportunity and nondiscrimination.

N. To be eligible for award, each Bidder must comply with the A*ffirmative Action* requirements which are contained in **Exhibit C** of the Construction Services Contract. A contractor having 50 or more employees and his subcontractor having 50 or more employees and who may be awarded a contract of $50,000 or more will be required to maintain an affirmative action program.

O. The "Area Covered" for this project is Maricopa County, Arizona (see also **Exhibit C**).

P. The attention of all Bidders is particularly directed to the requirements for nondiscrimination, equal employment opportunity and affirmative action both for themselves and their subcontractors. The bidder to whom a Contract is awarded shall be required to comply with all provisions of Executive Order 11246 of 24 September, 1965, as amended by Executive Order 11375 of 13 October, 1967, and of the rules, regulations, and relevant orders of the Secretary of Labor.

Q. A *Certification of Non-Segregated Facilities* must be submitted prior to the award of a federally assisted construction contract exceeding $10,000 which is not exempt from the provisions of the equal opportunity clause. All Bidders shall submit said certification with their bid.

R. All Bidders are also required to forward the following notice to their prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the equal opportunity clause.

"A *Certification of Non-Segregated Facilities* must be submitted prior to the award of a subcontract exceeding $10,000, which is not exempt from the provisions of the equal opportunity clause."

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

S. Within 30 days after award of this Contract, the Contractor shall file an *EEO Compliance Report* (Standard Form 100/ EEO-1) if:

a. The Contractor has not submitted a complete compliance report within 12 months preceding the date of award; and

b. The Contractor is within the definition of "employer" in Paragraph 11e(3) of the instructions included in Standard Form 100.

The Contractor shall require the subcontractor on any first-tier subcontract, irrespective of dollar amount, to file Standard Form 100 within 30 days after award of the subcontract if the above two conditions apply. Standard Form 100 will be furnished upon request.

T. Workforce Participation Goals. The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area (Maricopa County) are as follows:

Minority participation in each trade: 10.69%

Female participation in each trade: 6.9%

These are not DBE subcontract goals, but are workforce goals that are applicable to all of the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

Contractor's compliance with the executive order and 41 CFR part 60-4 shall be based on its implementation of the Equal Employment Opportunity clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on its projects.

The transfer of minority or female employees or trainees from contractor to contractor or from project to project, for the sole purpose of meeting the contractor's goals, shall be a violation of the contract, the executive order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

a. The contractor shall provide written notification to the *Director, Office of Federal Contract Compliance Programs (OFCCP)* within the U.S. Department of Labor, within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; estimated dollar amount of the subcontract; and the geographical area in which the subcontract is to be performed under 29 CFR Part 5 (paragraph 5.6(b)).

b. As used in this notice and in the contract resulting from this solicitation, the "Covered Area" is Maricopa County, Arizona.

c. When a determination has been made to award a contract or subcontract to a specific contractor, such contractor is required, prior to the award or after the award, or both, to furnish such other information as the FAA, the sponsor, or the Director of OFCCP requests.

d. Contractors and subcontractors may satisfy requirements of the EEO Contract Clause by stating in all solicitations or advertisements for employees that:

"All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin."

Or, by using the single advertisement in which appears, in clearly distinguishable type, the phrase:

"An equal opportunity employer."

e. See **Exhibit C** of the Construction Services Contract for additional information.

U. Women shall be afforded equal opportunity in all areas of employment; however, the employment of women shall not diminish the requirements for employment of minorities.

V. This project has a race/gender neutral goal for the utilization of Disadvantaged Business Enterprise (DBE) firms, in accordance with the regulations of the U.S. Department of Transportation (DOT) for grant-recipient contracting, 49 CFR, Part 26.

W. Falcon Field Airport has an established DBE Program in accordance with the regulations of the U.S. Department of Transportation (DOT), 49 CFR, Part 26. A copy of the DBE Program is available online at https://www.falconfieldairport.com/doing-business/disadvantaged-business-enterprise-dbe-program

X. DBE firms shall be afforded full opportunity to submit bids in response to this invitation and shall not be discriminated against on the grounds of race, color, or national origin in consideration for an award of any contract entered into pursuant to this advertisement.

Y. The City participates (through ADOT) in the *Arizona Unified Transportation Registration and Certification System (AZ UTRACS)*. Only DBE and Small Business Concern (SBC) firms that are certified by the AZ UTRACS are eligible for credit on ADOT projects. A list of DBE firms certified by AZ UTRACS is available on the internet at: https://adotdoors.dbesystem.com/.The list will indicate contact information and specialty for each DBE firm, and may be sorted in a variety of ways. However, the FAA, ADOT, and City do not guarantee the accuracy and/or completeness of this information, nor does the FAA, ADOT, or City represent that any licenses or registrations are appropriate for the work to be done.

The Contractor may also contact the ADOT Business Engagement and Compliance Office (BECO), DBE Supportive Services Program, at (602) 712-7761 for assistance in facilitating DBE and SBC outreach and notifications. Certification in AZ UTRACS is not a representation of qualifications and/or abilities. The Contractor bears all risk that the DBE or SBC may not be able to perform its work for any reason.

Z. The Contractor bears the responsibility to determine whether the DBE possesses the proper contractor's license(s) to perform the work. If a DBE cannot complete its work due to failure to obtain or maintain its licensing, the Contractor bears the responsibility to immediately replace the DBE with another DBE and to notify the City and ADOT.

AA. No assignment by the Contractor of any contract to be entered into hereunder, or any part thereof, or of funds to be received thereunder by the Contractor, will be recognized by the City of Mesa, unless such assignment has prior written approval from the City, and Contractor's Surety has been given due notice of such assignment and has consented thereto in writing.

BB. The Contract Time shall be as set forth in the Construction Services Contract.

CC. Liquidated damages shall be assessed as provided in the Construction Services Contract and the General Provisions.

DD. The City's grant agreements with the FAA and ADOT require the City to obtain approval from the FAA and ADOT for all contract awards following the receipt and tabulation of bids. The City will not award a contract until approval to do so is received from both the FAA and ADOT. **All Bidders are expressly notified that should approved grant funding become unavailable, for any reason, then a contract award will not be made and all bids will be rejected.** The City may, at its sole discretion, again advertise the project for bids at some future date when funding becomes available.

72. AIRPORT GATE ACCESS CONTROL AND SECURITY REQUIREMENTS:

The Contractor's staging and storage area for this project is accessible from Greenfield Road via Mallory Circle to Airport Gate No. 11. The gate is a RFID card access-controlled vehicular gate for security purposes. There are also manually operated construction gates available along the south side of Mallory Circle. Also, there is a fire hydrant available for construction water in the same area along Mallory Circle. These will be the access points approved for use by the Contractor, subcontractor, and suppliers from the public "land" side to the restricted "air" side of the airport.

The City will issue the Contractor a sufficient number of gate access cards to allow access onto the airport. Access card holders must ensure at all times that the gate closes properly each time the driver enters and departs through the gate to prevent unauthorized vehicles and/or pedestrians from entering onto the airport.

The Contractor, in lieu of issuing access cards to subcontractors and suppliers, may utilize a gate guard to monitor access through the gate and prevent inadvertent entry onto the Airport by unauthorized vehicles and/or pedestrians. When not actively in use, the gate must be kept powered and closed.

The Contractor shall be responsible to inform and educate all his subcontractors and suppliers of the airport safety procedures in using airfield controlled access gates. The Contractor shall be responsible to ensure that the airfield safety procedures are maintained at all times throughout the duration of the project.

The gate access cards remain the property of the City of Mesa at all times and final payment to the Contractor will not be made until all access cards have been returned to the City.

73. PROJECT NUMBERS:

All documents and official correspondence for this project shall reference the following:

MESA FALCON FIELD AIRPORT (FFZ)
MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAY D7 AND D8
FEDERAL A.I.P. 3-04-0023-035-2023
ADOT GRANT NO. TBD
CITY PROJECT NO. CP0994EAST

The City will confirm the assigned ADOT and FAA grant numbers and provide additional coordination on acceptable document formatting at the pre-construction meeting.

74. PROJECT CLEANLINESS:

Contractor is reminded that the City and its designated inspectors reserve the right to suspend work on this project due to deficiencies in cleanup, dust control, barricading, or traffic maintenance. See the General Provisions, General Technical Provisions, and Construction Safety and Phasing Plan for specific requirements.

The work under this contract is located on or adjacent to the runways, taxiways, and aircraft parking aprons at Falcon Field Airport. Unclean work areas pose a significant potential safety hazard to aircraft and people. The City Inspector will immediately stop all work upon observing any deficiencies in Contractor's cleanup, dust control, barricading, or traffic maintenance.

There will be no additional payments made, or contract time extensions granted, as a result of any stop work orders issued by the City because of Contractor's failure to maintain acceptable project cleanliness.

75. WORK STOPPAGE FOR ACCIDENTS:

In the event of an aircraft or other accident at the airport, the Contractor shall immediately cease all operations and remove all equipment from the work areas, as directed by the appropriate emergency responders (e.g., Police or Fire Department personnel) the City Inspector, the Airport Representative or his authorized representatives. The Contractor shall not return equipment to the work areas, nor resume operations until given approval to do so by the City Inspector. This shall be considered an excusable/ non-compensable delay under the contract.

76. AIRPORT CONSTRUCTION RESTRICTIONS AND REQUIREMENTS:

The Contractor is responsible for compliance at all times with the safety requirements and guidelines specified in *Falcon Field Airport Construction Safety Phasing Plan (CSPP)* for this project, which has been filed as Aeronautical

Study Number (ASN) **2023-AWP-1826-NRA** in the *FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA)* program, in accordance with 14 CFR Part 77.

The Contractor is required to submit a **Safety Plan Compliance Document** outlining how they intend to comply with the established CSPP requirements. See the General Technical Provisions for additional information.
See the General Provisions Section 70, General Technical Provisions Item 20, and Construction Safety and Phasing Plan (CSPP), for complete, detailed, requirements.

77. ARIZONA STATE REQUIREMENTS:

The Contractor shall comply at all times with the provisions of Arizona Executive Order 75-5, as amended by Executive Order 99-4, relating to equal opportunity and nondiscrimination. The duly authorized representative(s) of the State of Arizona shall have access to any books, documents, papers, and records of the Contractor which are in any way pertinent to this contract for a period of five (5) years following the City's Letter of Acceptance, in accordance with A.R.S. 35-214, for the purpose of making inspections, audits, examinations, excerpts and transcripts.

78. WORK NOT PERMITTED:

No work is permitted on-site during the following time frame: 11:59 PM November 2, 2023 and 11:59 PM November 5, 2023.

The contractor's project schedule must be phased to ensure all runways and taxiways are open to aircraft traffic during this time.

ATTACHMENT A – Not Used

(1 PAGE)

RELEASE FORM

Project Name:

Project Number:

Contractor's Name:

Office Phone Number:

Job Superintendent's Name:

Nature of Work:

I, _____, representing the property at _____
(Name - - Please print) (Address)

acknowledge that the Contractor has satisfactorily restored my property to its Pre-Construction condition. It is understood that this form will release the Contractor from any further action with regard to the aesthetics of my property. This form does not necessarily release the Contractor from further action as a result of warranty Work or undisclosed damage to my property as a result of their Work for a period of one year.

Signed: _____ Date: _____

ATTACHMENT B

BACKGROUND CHECK GUIDELINES
Contractor/Non-Employee Staff

(2 PAGES)

☒ LEVEL 1: Use **Attachment B.1** (5 PAGES)

ATTACHMENT B

BACKGROUND CHECK GUIDELINES
Contractor/Non-Employee Staff

Purpose
These guidelines were established in an effort to provide guidance to departments in determining when a contractor and/or non-employee staff would be subject to a background check.

For the purpose of this Attachment the term "contractor" is defined as an independent contractor and/or contract worker. The term "Non-employee staff" is defined as a temporary agency worker, volunteer, intern, extern, etc.

Guidelines
The levels referenced below (0 through 3) were developed to assist departments in determining the appropriate type of background needed, if any, for all contractors and/or non-employee staff members providing services to the City.

Determining the appropriate type of background is primarily based on the work the contractor/ non-employee staff will be performing, the location, the duration and his/her exposure to minors, disabled and the homebound or high security facilities, systems, information, etc.

The department representative will be responsible for determining the type of background required and for sending the contractor/non-employee staff to Human Resources (HR), Secureone Livescan, or Mesa Police Department (PD) to initiate the background process as outlined below. If there are any questions, please contact engineeringcontractorbadging@mesaaz.gov

Exceptions to Personnel Rules – Fingerprint Requirements
In an effort to meet the business needs of departments in the handling of unique circumstances the HR Director has granted the following exceptions to the Personnel Rules regarding fingerprint requirements:

a. **One-day Weekend Events:** Fingerprinting (and web-based background) requirements may be waived for individuals volunteering at one-day or weekend events.

b. **Students/non-paid Interns:** In lieu of fingerprinting, a web-based background (Level 1) will be required for any student/non-paid intern volunteering at a City facility as part of a semester course requirement regardless of the hours volunteering during the semester. See Level 1 below for instructions on how to complete this.

c. **Touring Artists:** Fingerprinting and web-based background requirements may be waived for individuals providing services to the Mesa Art Center on a short-term basis. These individuals will be continually supervised.

Temporary Agency Workers Note
Temporary agency workers hired through Allstaff Temporary Agency will complete a web-based (Level 1) background check conducted by Allstaff Temporary Agency and ALL Temporary Agency Workers will complete a web-based background check conducted by City of Mesa prior to assignment.

Important Note
For Level 1 through 3, background results must be received **prior to** a badge and/or building access being granted by the PD /Facilities Access.

ATTACHMENT B.1

Important Note

For Level 1 through 3, background results must be received **prior to** a badge and/or building access being granted by the PD /Facilities Access.

LEVEL 1

Web Based Background Check. No fingerprinting required.

This level is required for all secured City buildings and sites not included in Levels 2 or 3 and includes: utility treatment plants, well sites, PRV stations, MCP Building, fire stations, service centers, maintenance shops, 55 N. Center, Council Chambers, Utilities Building, Transportation Building, electrical substations, UCC, TMC, etc.

This type of background check is based on: name, date of birth, social security number, and address and will provide criminal history for at least the past 7 years. Results are typically received within 24 to 48 hours. Although this type of background is not as extensive as the fingerprint background, it does allow the City to obtain criminal history on individuals who do not meet the fingerprinting criteria as indicated in the City's ordinance (i.e., Personnel Rules).

The search includes a nationwide criminal search, nationwide sex offender search and Social Security trace. There are two ways to obtain a level 1 badge, Web-Based Background check through the City of Mesa, or the contractor can provide a valid Arizona Department of Public Safety (DPS) Identity Verified Prints (IVP) Clearance Card. The cost of the web-based background check search is charged back to the department and/or project by HR upon receipt of invoice, while the IVP Clearance Card is an expense of the contractor.

Option 1 - Requesting a Web-Based Background Check and Identification Card (Badge)

REQUIRED PROCESS (SUBMIT DOCUMENTS IN ORDER LISTED BELOW):

- **Contractor Background Authorization Active Screening Form** (hrbackgroundchecks@mesaaz.gov)
  - Top section completed by City.
  - Contractor employees complete their names and information. The form must be signed and submitted to **HR** along with a legible photo copy of the front and back of an approved official government ID.
  - **NOTE:** Incomplete information will delay the process and notification of clearance. Please make sure to fill in the Contractor/Subcontractor Company Name.
  - Forms may also be submitted to Human Resources office at Mesa City Plaza Building, Personnel Office 20 E. Main Street, Suite 130.
  - Human Resources receives results and then updates their system. The City Contact (PM) is notified of status updates and then notifies the Prime Contractor for the project. The Prime Contractor then notifies each subcontracting company separately.
  - Upon confirmed clearance notification, contractors can begin PD's process for badging and, if applicable, building access**. No personnel are to go to the Badging Office until they have received notification from the City that they have been approved.**
- **Contractor Verification Form** (badging@mesaaz.gov)
  - Completed by Contractor and submitted to **Badging Office**.
    - This form can be submitted prior to notification of clearance approval, but employees may not get badges.
    - Contractor is responsible for keeping this form up-to-date.
    - Subcontractors are to complete their own form.
- **Identification Card Request Form – Contractor** (badging@mesaaz.gov)
  - Partially completed by City contact person (items in yellow)
    - **NOTE:** Responsible RC is Department Number; Expiration Date is the end date of the contract (when badge/ID Card no longer required).
  - Partially completed by Contractor and Subcontractor if applicable (items in gray)
  - Submitted to **Badging Office**
    - **NOTE:** Contractors and Subcontractors are not to go to Badging Office until after Clearance obtained and after correct and up-to-date Contractor Verification Form is on file. ID will only be printed if Contractors name is on the Contractor Verification Form.
- **Copy of Drivers License or Identification**
- **Jpg Photo - MVD style,** headshot taken on a plain wall/backdrop, no sunglasses, no hats**.**

Option 2 - Standard Fingerprint Clearance Card
A valid Arizona Department of Public Safety (DPS) Identity Verified Prints (IVP) Clearance Card is acceptable for this level.

Contractor shall provide IVP fingerprint clearance card number on the Contractor Verification Form.

REQUIRED PROCESS (SUBMIT DOCUMENTS IN ORDER LISTED BELOW):

- **Contractor Verification Form** (badging@mesaaz.gov & EngineeringContractorBadging@mesaaz.gov)
  - Completed by Contractor and submitted to **Badging Office**.
    - Include IVP clearance card number
    - Contractor is responsible for keeping this form up-to-date.
    - Subcontractors are to complete their own form.
- **Identification Card Request Form – Contractor** (badging@mesaaz.gov)
  - Partially completed by City contact person (items in yellow)
    - **NOTE:** Responsible RC is Department Number; Expiration Date is the end date of the contract (when badge/ID Card no longer required).
  - Partially completed by Contractor and Subcontractor if applicable (items in gray)
  - Submitted to **Badging Office**
    - **NOTE:** Contractors and Subcontractors are not to go to Badging Office until after notice of verification is received and after correct and up-to-date Contractor Verification Form is on file. ID will only be printed if Contractors name is on the Contractor Verification Form.
- **Copy of Drivers License or Identification**
- **Jpg Photo - MVD style,** headshot taken on a plain wall/backdrop, no sunglasses, no hats.

Level 1 Background Authorization

Level 1 – Required for all secured City buildings and sites (MCP, Utilities, Transportation, Maintenance Shops, etc.)

Applicant: Type or clearly print all requested information and sign below. Incomplete forms will not be processed.

First Name	Middle Name	Last Name

Street Address with Apt. #	City, State, Zip Code

Social Security Number	Date of Birth (MM/DD/YYYY)	Other Names Used

Driver's License #	Driver's License State	Primary Phone Number

Contractors Only
The contractor and/or sub-contractor I work for is:

Notice – Please Read and Sign Below

In connection with my application for employment, contractor or to serve as a volunteer with **City of Mesa** ("Client'), I understand that a "consumer report" and/or "investigative consumer report", as defined by the Fair Credit Reporting Act, will be requested by Client for employment or volunteer purposes, whichever is applicable, from Active Screening, Inc., ("Active Screening"), a consumer reporting agency as defined by the Fair Credit Reporting Act. These reports may include information as to my character, general reputation, personal characteristics or mode of living, whichever are applicable. They may involve interviews with sources such as my neighbors, friends or associates. The report may also contain information about me relating to my criminal history, credit history, driving and/or motor vehicle records, social security number verification, verification of education or employment history, worker's compensation (only after a conditional job offer) or other background checks. Such reports may be obtained at any time after receipt of this Disclosure and Authorization and if I am hired or serve as a volunteer, whichever is applicable, throughout the course of my employment or volunteer service, as permitted by law and unless revoked by me in writing. I understand that I have the right, upon written request made within a reasonable amount time after the receipt of this notice, to request disclosure of the nature and scope of any investigative consumer report to Active Screening, Inc., 14499 N. Dale Mabry Hwy., Suite 201 South, Tampa, FL 33618 or 1-800-319-5580. For information about Active Screening's privacy practices, see www.activescreening.com.

Residents of Minnesota and Oklahoma only:
Under state law you have a right to receive a copy of your consumer report, free of charge, if one is required by Client. By checking the below box, a copy will be provided to you at the address you provide on this Disclosure and Authorization.
□ I wish to receive a copy of any consumer report on me that is requested.

Residents of New York only:
Under state law you have the right to inspect and receive a copy of any investigative consumer report requested by Client by contacting Active Screening directly. You also acknowledge receipt of a copy of Article 23-A of the New York Correction Law by checking the below box.
□ I acknowledge receipt of a copy of Article 23-A of the New York Correction Law.

Residents of Washington State only:
Under state law you have a right to request a copy of the Washington Fair Credit Reporting Act's disclosure to consumers (RCW 19.182.070) and a copy of your report by contacting Active Screening directly.

Residents of California and Maine only:
Under state law you have a right to receive a copy of your investigative consumer report and/or consumer credit report, free of charge, if one is requested by Client. By checking the box below a copy of your report will be provided to you at the address you provide on this Disclosure and Authorization.
□ I wish to receive a copy of any report on me that is requested

By signing below, I voluntarily and knowingly authorize Client or its authorized agents to obtain or prepare consumer reports or investigative consumer reports about me. I acknowledge receipt of a copy of *A Summary of Your Rights under the Fair Credit Reporting Act* and certify that I have read this Disclosure and Authorization as well as the summary explaining my rights under the Fair Credit Reporting Act.

Signature	**Date**

Deliver this form & present a valid, current state issued ID document to:
City of Mesa Human Resources Office, Attn: Personnel, 20 E. Main Street, Suite 130, Mesa, AZ 85201
OR scan the front and back of valid, current state issued ID and email with this completed form to:
webbasedbackgroundauthorizations@mesaaz.gov

CITY USE ONLY

Check One: ☐New Hire ☐Seasonal ☐Temporary Agency Worker ☐Volunteer ☐Intern ☐Extern ■ Contractor

Dept #: F165	Job Title **OR** Project Name: Midfield Crossover Taxiway East and Realignment of Taxiway D7 and D8
Project #: CP0994EAST	Dept. Contact/Phone: Kayleen Cordiak **480-644-** 2251

Fund	Subfund	Dept	Unit	Appr	Object	Activity	Sub Act	RC/Phase
3004	FF	F920	1675	2	2180	1393		104

CONTRACTOR VERIFICATION FORM

Mesa City Policy and/or Arizona Revised Statute (ARS) §41-4401 requires certification of compliance with Federal immigration laws and regulations and State laws regarding verification of employment eligibility of a contractor's and any subcontractor's employees.

By completing and signing this form and the attached Employee Verification Worksheet, the contractor is attesting that it and all subcontractors performing work under the cited contract meet all requirements contained herein. Failure to complete and submit this form and attached worksheet on or before the due date specified and/or the falsification of any information provided herein may be grounds for termination of the contract.

I hereby attest that:

1. The contractor complies with the Federal Immigration and Nationality Act (FINA), the Immigration Reform and Control Act of 1986 (IRCA) all other Federal immigration laws and regulations, and ARS §23-214 (as applicable) related to the verification of employment eligibility of those employees performing work under this contract;
2. All subcontractors performing work under this contract comply with FINA, IRCA all other Federal immigration laws and regulations, and ARS §23-214 (as applicable) related to the verification of employment eligibility of those employees performing work under this contract; and
3. The contractor has identified all contractor and subcontractor employees who perform work under the contract on the attached Employee Verification Worksheet and has verified compliance with FINA, IRCA all other Federal immigration laws and regulations, and ARS §23-214 (as applicable) for each employee listed.

Project CP0994EAST Midfield Crossover Taxiway East and Realignment of Taxiway D7 and D8
Name (as listed in the contract):
Street Name and Number:
City: State: Zip Code:
Authorized Contractor (Employer) Signature:
Printed Name:
Title:
Date:
Company Subcontracting Under (i*f applicable*):

Email to Badging@mesaaz.gov.

CONTRACTOR VERIFICATION FORM

Project No CP0994EAST

Employee Verification Worksheet

EMPLOYEE(S) NAME - PLEASE TYPE OR PRINT

Employee Name	Hire Date	Date of Birth	Employment Eligibility Method (I-9 or E-Verify)	Identify Verified Print Number (if applicable)	Office Use
1.			E I		D J F
2.			E I		D J F
3.			E I		D J F
4.			E I		D J F
5.			E I		D J F
6.			E I		D J F
7.			E I		D J F
8.			E I		D J F
9.			E I		D J F
10.			E I		D J F
11.			E I		D J F
12.			E I		D J F
13.			E I		D J F
14.			E I		D J F
15.			E I		D J F
16.			E I		D J F
17.			E I		D J F
18.			E I		D J F
19.			E I		D J F
20.			E I		D J F

Email to Badging@mesaaz.gov.

Identification Card Request Form - Contractor

Please Print (Use ink only) **Preferred Name:** _____

First Name: _____ **M.I.:** _____ **Last Name:** _____ **Emp.#:** _____

Dept# F165 **Department Name:** ENGINEERING **Ext:** 2251

☐ New ☐ Modify Expiration Date ☐ Modify Background Clearance level

*Contractor Verification Form, Government ID and Jpeg Photo Required

Cleared By **Date Cleared**

Background Level:
☐ 0 - None ☐ 1 - Web-based ☐ 2 - Fingerprint ☐ 3 - PD ☐ 4 - PD
☐ HR ☐ PD ☐ IVP

Responsible RC: F165 **City Contact Person:** Kayleen Cordiak **Ext:** 2251

Expiration Date: _____ **Cardholder's Employer:** _____ **Phone:** ( )

Company Subcontracting Under:

Please Initial:

1. _____ **Identification/Access cards are assigned to a single individual and may not be transferred.**
2. _____ **Identification/Access cards are not to be loaned to another person for any reason.**
3. _____ **Lost, misplaced, stolen and damaged identification cards must be reported immediately to the badging office (644-5113) and to the city department project manager.**
4. _____ **Identification cards are the property of the City of Mesa and must be surrendered upon termination of the project or expiration of the contract.**

I have read and understand the conditions listed above and agree to abide by them. I further understand that violation of these conditions may result in future project eligibility.

Signature of Card Holder: _____ **Emp. #:** _____ **Date:** _____

Authorized COM Signature: _____ **Ext:** 2251 **Date:** _____

Authorized COM Printed Name: _____

For Office Use Only:

☐ ID Card Only ☐ ID and Access Card – See page two ☐ ID and Kronos Only

Issued By: _____ **Emp #:** _____ **Date:** _____

Email to Badging@mesaaz.gov.

ATTACHMENT C
– Not Used
(1 PAGE)

City of Mesa
Sewer Lateral Inspection Report

Company: _____
Quarter Section: _____
Inspector: _____
Camera Crew: _____
Engineering: _____
Date: _____
Tape / CD: _____

Contractor Signature: _____ Date: _____

City of Mesa Inspector: _____ Date: _____

Address	Meter #	No Conflict	Verified by Separation Electronic Location Gas / Sewer	Verified by Camera Inspection	Verified by Dig Inspection	COMMENTS
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
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GENERAL PROVISIONS

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Part 1 – General Contract Provisions

Section 10 Definition of Terms

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

Paragraph Number	Term	Definition
10-01	**AASHTO**	The American Association of State Highway and Transportation Officials.
10-02	**Access Road**	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	**Advertisement**	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	**Airport**	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	**Airport Improvement Program (AIP)**	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	**Air Operations Area (AOA)**	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	**Apron**	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	**ASTM International (ASTM)**	Formerly known as the American Society for Testing and Materials (ASTM).

Paragraph Number	Term	Definition
10-09	**Award**	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
10-10	**Bidder**	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
10-11	**Building Area**	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
10-12	**Calendar Day**	Every day shown on the calendar.
10-13	**Certificate of Analysis (COA)**	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
10-14	**Certificate of Compliance (COC)**	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.
10-15	**Change Order**	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	**Contract**	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	**Contract Item (Pay Item)**	A specific unit of work for which a price is provided in the contract.
10-18	**Contract Time**	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of

Paragraph Number	Term	Definition
		calendar or working days, the contract shall be completed by that date.
10-19	**Contractor**	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	**Contractors Quality Control (QC) Facilities**	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	**Contractor Quality Control Program (CQCP)**	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	**Control Strip**	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	**Construction Safety and Phasing Plan (CSPP)**	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	**Drainage System**	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	**Engineer**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.
10-26	**Equipment**	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	**Extra Work**	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to

Paragraph Number	Term	Definition
		complete the work within the intended scope of the contract as previously modified.
10-28	**FAA**	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	**Federal Specifications**	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
10-30	**Force Account**	**a.** Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. **b.** Owner Force Account - Work performed for the project by the Owner's employees.
10-31	**Intention of Terms**	Whenever, in these specifications or on the plans, the words “directed,” “required,” “permitted,” “ordered,” “designated,” “prescribed,” or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words “approved,” “acceptable,” “satisfactory,” or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.
10-32	**Lighting**	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	**Major and Minor Contract Items**	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.

Paragraph Number	Term	Definition
10-34	**Materials**	Any substance specified for use in the construction of the contract work.
10-35	**Modification of Standards (MOS)**	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	**Notice to Proceed (NTP)**	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	**Owner**	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is **City of Mesa**.
10-38	**Passenger Facility Charge (PFC)**	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
10-39	**Pavement Structure**	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
10-40	**Payment bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
10-41	**Performance bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
10-42	**Plans**	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
10-43	**Project**	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	**Proposal**	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work

Paragraph Number	Term	Definition
		and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	**Proposal guaranty**	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	**Quality Assurance (QA)**	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	**Quality Control (QC)**	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	**Quality Assurance (QA) Inspector**	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
10-49	**Quality Assurance (QA) Laboratory**	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	**Resident Project Representative (RPR)**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	**Runway**	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	**Runway Safety Area (RSA)**	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	**Safety Plan Compliance Document (SPCD)**	Details how the Contractor will comply with the CSPP.
10-54	**Specifications**	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the

Paragraph Number	Term	Definition
		contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	**Sponsor**	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	**Structures**	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	**Subgrade**	The soil that forms the pavement foundation.
10-58	**Superintendent**	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.
10-59	**Supplemental Agreement**	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%: (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	**Surety**	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	**Taxilane**	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	**Taxiway**	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	**Taxiway/Taxilane Safety Area (TSA)**	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See

Paragraph Number	Term	Definition
		the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	**Work**	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	**Working day**	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.
10-66	**Owner Defined terms**	None.

END OF SECTION 10

Section 20 Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders). Engineering bid website can be found at this link: https://www.mesaaz.gov/business/engineering/construction-bid-opportunities-and-results.

The Owner has published the advertisement at such places and at such times as are required by local law or ordinances. The published advertisement states the time and place for submitting sealed proposals; a description of the proposed work; instructions to bidders as to obtaining proposal forms, plans, and specifications; proposal guaranty required; and the Owner's right to reject any and all bids.

20-02 Qualification of bidders. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

20-03 Contents of proposal forms. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09 *Irregular proposals*.

Mobilization is limited to 10 percent of the total project cost.

A prebid conference is required on this project to discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements. Prebid conference is scheduled for 9:00 AM Thursday, April 27, 2023 at Falcon Field Airport Conference Room located at 4800 E. Falcon Drive Mesa, AZ 85215.

20-04 Issuance of proposal forms. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.

b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.

c. Documented record of Contractor default under previous contracts with the Owner.

d. Documented record of unsatisfactory work on previous contracts with the Owner.

20-05 Interpretation of estimated proposal quantities. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, Alteration of Work and Quantities, without in any way invalidating the unit bid prices.

20-06 Examination of plans, specifications, and site. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. Bidders shall satisfy themselves to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

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

20-07 Preparation of proposal. The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

Prices should generally be written in whole dollars and cents. The extended total amount of each item should not be rounded.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

20-08 Responsive and responsible bidder. A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

20-09 Irregular proposals. Proposals shall be considered irregular for the following reasons:

a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.

b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.

c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.

d. If the proposal contains unit prices that are obviously unbalanced.

e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.

f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-10 Bid guarantee. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral, shall be made payable to the Owner.

a. Prior to execution of the Contract, Contractor shall provide a Performance Bond and a Payment Bond, each in an amount equal to the full amount of the Contract Price.

b. Each such bond shall be executed by a surety company or companies holding a Certificate of Authority to transact surety business in the State of Arizona, issued by the Director of the Arizona Department of Insurance. A copy of the Certificate of Authority shall accompany the bonds. The Certificate shall have been issued or updated within two (2) years prior to the execution of this Agreement. The bonds shall be written or countersigned by an authorized representative of the surety who is either a resident of the state of Arizona or whose principal office is maintained in this state, as by law required.

c. The bonds shall be made payable and be acceptable to City. The bond forms for the performance and payment bonds shall be in the forms required under A.R.A. § 34-221, et. Seq., as in Appendix 5 and 6 of these General Conditions, respectively.

d. Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract Documents, Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

e. All bonds submitted for this project shall be provided by a company which has been rated AM Best rating of A- or better for the prior four quarters by the latest edition of the 'Results Best's Key Rating Guide (Property/Casualty)" published by the A.M. Best Company.

f. Personal or individual bonds are not acceptable.

20-11 Delivery of proposal. Sealed bids will be received until Thursday, May 11, 2023, at 1:00 p.m. All sealed bids will be received electronically at EngineeringBids@mesaaz.gov . Bids must be submitted as an unencrypted PDF attachment with a maximum size limit of 20MB. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Any bid received after the time specified will be returned without any consideration.

20-12 Withdrawal or revision of proposals. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing or by email before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-13 Public opening of proposals. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

20-14 Disqualification of bidders. A bidder shall be considered disqualified for any of the following reasons:

a. Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.

b. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.

c. If the bidder is considered to be in "default" for any reason specified in paragraph 20-04, *Issuance of Proposal Forms,* of this section.

20-15 Discrepancies and Omissions. A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than **9** days prior to bid opening.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

END OF SECTION 20

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Section 30 Award and Execution of Contract

30-01 Consideration of proposals. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

a. If the proposal is irregular as specified in Section 20, paragraph 20-09, *Irregular Proposals*.

b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *Disqualification of Bidders*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

30-02 Award of contract. The award of a contract, if it is to be awarded, shall be made within **90** calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

30-03 Cancellation of award. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07 *Approval of Contract*.

30-04 Return of proposal guaranty. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *Consideration of Proposals.* Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *Requirements of Contract Bonds.*

30-05 Requirements of contract bonds. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-06 Execution of contract. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, Requirements of Contract Bonds, of this section, within 10 calendar days from the date mailed or otherwise delivered to the successful bidder.

30-07 Approval of contract. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the fully executed contract to the Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

30-08 Failure to execute contract. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-06, *Execution of Contract,* of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidated damages to the Owner.

END OF SECTION 30

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Section 40 Scope of Work

40-01 Intent of contract. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-02 Alteration of work and quantities. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *Compensation for Altered Quantities*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

40-03 Omitted items. The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *Payment for Omitted Items*.

40-04 Extra work. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work

covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-05 Maintenance of traffic. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (http://mutcd.fhwa.dot.gov/), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways.

40-06 Removal of existing structures. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or

grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 Rights in and use of materials found in the work. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,

b. Remove such material from the site, upon written approval of the RPR; or

c. Use such material for the Contractor's own temporary construction on site; or,

d. Use such material as intended by the terms of the contract.

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

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

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

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

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

40-08 Final cleanup. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

END OF SECTION 40

Section 50 Control of Work

50-01 Authority of the Resident Project Representative (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

50-02 Conformity with plans and specifications. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

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

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If

any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

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

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

50-04 List of Special Provisions.

1. Change Orders
2. Addenda
3. Construction Services Contract
4. Project Specific Provisions
5. General Conditions to the Construction Services Contract
6. General Provisions
7. General Technical Provisions
8. Technical Specifications
9. Construction Plans/Drawings
10. City of Mesa Supplement to the MAG Specifications and Details
11. MAG Uniform Standard Specifications and Details

51-05 Cooperation of Contractor. The Contractor shall be supplied with an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

50-06 Cooperation between Contractors. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

50-07 Construction layout and stakes. The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): Comma Separated Values (CSV) in PNEZD format, PDF, and CAD.

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

50-08 Authority and duties of Quality Assurance (QA) inspectors. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

50-09 Inspection of the work. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

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

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor’s expense.

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

50-10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

50-11 Load restrictions. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

50-12 Maintenance during construction. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

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

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

50-13 Failure to maintain the work. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency

that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 Partial acceptance. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50-15 Final acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

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

END OF SECTION 50

Section 60 Control of Materials

60-01 Source of supply and quality requirements. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

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

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

60-02 Samples, tests, and cited specifications. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

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

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

A copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

60-03 Certification of compliance/analysis (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

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

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

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

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

b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

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

60-04 Plant inspection. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

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

a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.

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

c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

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

60-05 Engineer/ Resident Project Representative (RPR) field office. An Engineer/RPR field office is not required.

60-06 Storage of materials. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 Unacceptable materials. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

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

60-08 Owner furnished materials. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

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

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

Section 70 Legal Regulations and Responsibility to Public

70-01 Laws to be observed. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

70-02 Permits, licenses, and taxes. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

70-03 Patented devices, materials, and processes. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-04 Restoration of surfaces disturbed by others. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows: **No authorized work by others indicated**.

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 Federal Participation. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 Sanitary, health, and safety provisions. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

70-07 Public convenience and safety. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *Maintenance of Traffic,* and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-08 Construction Safety and Phasing Plan (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is on sheet(s) G050 to G057 of the project plans.

70-09 Use of explosives. The use of explosives is not permitted on this project.

70-10 Protection and restoration of property and landscape. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

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

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

70-11 Responsibility for damage claims. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the

Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

70-12 Third party beneficiary clause. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 Opening sections of the work to traffic. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

This project will be completed in three separate schedules with the project having a total of six phases as specified in the CSPP and construction drawings.

1) Schedules II and III, Phase 1 – Construct Midfield Crossover Taxiway East (Construction Safety Drawing G052)

   During this phase, the Contractor will be clearing and grubbing the area between Runways 4L/22R and 4R/22L, preparing subgrade, constructing base course, and constructing the new asphalt pavement section for the portion of the midfield crossover taxiway outside the Runway Safety Areas for both runways. ALCMS work may also occur during this phase.

   Phase 1 will be partially concurrent with Phase 2. Phase 2 will begin once the earthwork and base course for Phase 1 have been completed.

   Phase 1 is anticipated to take 65 calendar days

2) Schedule II, Phase 2 – Construct Midfield Crossover Taxiway East (Construction Safety Drawing G053)

   During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Runway 4L/22R, preparing subgrade, constructing base course, and constructing the new asphalt pavement section.

   Phase 2 will be completed concurrently with Phase 1. Phase 2 will begin after the subgrade and base course operations are completed for Phase 1.

   Phase 2 is anticipated to take 10 calendar days

3) Schedule II, Phase 3 – Construct Midfield Crossover Taxiway East (Construction Safety Drawing G054)

   During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Runway 4L/22R, preparing subgrade, constructing base course, and constructing the new asphalt pavement section.

   Phase 3 will be completed concurrently with Phases 4, 5, and 6. Phase 3 will begin after the subgrade and base course operations are completed for Phases 4 and 5.

   Phase 3 is anticipated to take 12 calendar days

4) Schedules I and III, Phase 4 – Realignment of Taxiways D7 and D8 (Construction Safety Drawing G055)

   During this phase, the Contractor will be clearing and grubbing, removing the existing portion of taxiways D7 and D8 in the area between the Runway 4R/22L safety area and Taxiway D, preparing subgrade, constructing base course, and constructing the new asphalt pavement section for the realigned Taxiways D7 and D8. ALCMS work may also occur during this phase.

   Phase 4 will be partially completed concurrently with Phases 3, 5, and 6. Phase 4 will begin after the completion of Phases 1 and 2.

   Phase 4 is anticipated to take 102 calendar days

5) Schedule I, Phase 5 –Realignment of Taxiways D7 and D8 (Construction Safety Drawing G056)

   During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Taxiway D, preparing subgrade, constructing base course, and constructing the new asphalt pavement section.

   Phase 5 will be completed concurrently with Phases 3, 4, and 6. Phase 5 will begin after the subgrade and base course operations are completed for Phase 4.

   Phase 5 is anticipated to take 27 calendar days

6) Schedule I, Phase 6 –Realignment of Taxiways D7 and D8 (Construction Safety Drawing G057)

   During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Runway 4R/22L, preparing subgrade, constructing base course, and constructing the new asphalt pavement section.

   Phase 6 will be completed concurrently with Phases 3, 4, and 5. Phase 6 will begin after the subgrade and base course operations are completed for Phases 4 and 5.

   Phase 6 is anticipated to take 12 calendar days

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *Partial Acceptance*.

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

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

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

70-14 Contractor's responsibility for work. Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

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

70-15 Contractor's responsibility for utility service and facilities of others. As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

Utility	Description	
Water	City of Mesa	
Electrical	Salt River Project	
Airport	City of Mesa (Communications & Special Systems)	
Telephone	CenturyLink	Emergency Repair Service Phone Number 800.954.1211
Sanitation	City of Mesa	
Drainage	Maricopa Flood Control District, City of Mesa	
Flood Plain	The project is within the 500-year flood plain.	

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

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed By Others*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

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

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

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

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

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-16 Furnishing rights-of-way. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 Personal liability of public officials. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 No waiver of legal rights. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

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

70-19 Environmental protection. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

70-20 Archaeological and historical findings. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not

contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

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

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work,* and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

70-21 Insurance Requirements. Contractor shall obtain, maintain, and provide verification of insurance coverage set forth in Exhibit B of the Contract.

END OF SECTION 70

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Section 80 Execution and Progress

80-01 Subletting of contract. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least 25% percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

80-02 Notice to proceed (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within 30 days of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 Execution and progress. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 48 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM) format. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

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

80-04 Limitation of operations. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

- Runways (as identified in CSPP and construction drawings)
- Taxiways (as identified in CSPP and construction drawings)

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

80-04.1 Operational safety on airport during construction. All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

80-05 Character of workers, methods, and equipment. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

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

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

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

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

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

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 Temporary suspension of the work. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the

effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

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

80-07 Determination and extension of contract time. The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

80-07.1 Contract time based on calendar days. Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

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

80-08 Failure to complete on time. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract. See Construction Services Contract.

The maximum construction time allowed for Schedules I, II, and III will be the sum of the time allowed for individual schedules but not more than 230 days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a wavier on the part of the Owner of any of its rights under the contract.

80-09 Default and termination of contract. The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or

b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or

c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or

d. Discontinues the execution of the work, or

e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or

g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or

h. Makes an assignment for the benefit of creditors, or

i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

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

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

80-10 Termination for national emergencies. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

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

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

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

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 Work area, storage area and sequence of operations. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

Section 90 Measurement and Payment

90-01 Measurement of quantities. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

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

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

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

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

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

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term "ton" will mean the short ton consisting of 2,000 pounds (907 km) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this

Term	Description
	purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the scale, but not less than one pound (454 grams). The use of spring balances will not be permitted.

Term	Description
	In the event inspection reveals the scales have been "overweighing" (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%. In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded. Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them. Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment. All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Rental Equipment	Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 *Payment for Extra Work*.
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-02 Scope of payment. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *No Waiver of Legal Rights*.

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

90-03 Compensation for altered quantities. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work*

and Quantities, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 Payment for omitted items. As specified in Section 40, paragraph 40-03, *Omitted Items,* the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

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

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

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

90-05 Payment for extra work. Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

90-06 Partial payments. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

a. From the total of the amount determined to be payable on a partial payment, 10% of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-14. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.

(2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.

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

c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

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

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment*.

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

90-07 Payment for materials on hand. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

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

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

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

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

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-08 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request

that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

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

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

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

90-09 Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes,* or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 Construction warranty.

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract

requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within fourteen (14) days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

j. Project Operation and Maintenance (O&M) Manual(s).

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

END OF SECTION 90

Part 2 – General Construction Items

Item C-100 Contractor Quality Control Program (CQCP)

100-1 General. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

a. Provide qualified personnel to develop and implement the CQCP.

b. Provide for the production of acceptable quality materials.

c. Provide sufficient information to assure that the specification requirements can be met.

d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.

b. Discussion of the QA program.

c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.

d. Establish regular meetings to discuss control of materials, methods and testing.

e. Establishment of the overall QC culture.

100-2 Description of program.

a. General Description. The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors.

The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

b. Contractor Quality Control Program (CQCP). The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least 14 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following:

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

100-3 CQCP organization. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

(1) Professional Engineer with one (1) year of airport paving experience.

(2) Engineer-in-training with two (2) years of airport paving experience.

(3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.

(4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

b. QC technicians. A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher, and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA and shall perform the following functions:

(1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 100-6.

(2) Performance of all QC tests as required by the technical specifications and paragraph100-8.

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

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

c. Staffing levels. The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

100-4 Project progress schedule. Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *Execution and Progress*.

100-5 Submittals schedule. The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

a. Specification item number

b. Item description

c. Description of submittal

d. Specification paragraph requiring submittal

e. Scheduled date of submittal

100-6 Inspection requirements. QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections shall include the following minimum requirements:

a. During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

b. During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other QC functions will be accomplished and used.

100-7 Contractor QC testing facility.

a. For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

- 8.1.3 Equipment Calibration and Checks;
- 8.1.9 Equipment Calibration, Standardization, and Check Records;
- 8.1.12 Test Methods and Procedures

b. For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

100-8 QC testing plan. As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

a. Specification item number (e.g., P-401)

b. Item description (e.g., Hot Mix Asphalt Pavements)

c. Test type (e.g., gradation, grade, asphalt content)

d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)

e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)

f. Responsibility (e.g., plant technician)

g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-9.

100-9 Documentation. The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

a. Daily inspection reports. Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

(1) Technical specification item number and description

(2) Compliance with approved submittals

(3) Proper storage of materials and equipment

(4) Proper operation of all equipment

(5) Adherence to plans and technical specifications

(6) Summary of any necessary corrective actions

(7) Safety inspection

(8) Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

b. Daily test reports. The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

(1) Technical specification item number and description

(2) Test designation

(3) Location
(4) Date of test
(5) Control requirements
(6) Test results
(7) Causes for rejection
(8) Recommended remedial actions
(9) Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

100-10 Corrective action requirements. The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

100-11 Inspection and/or observations by the RPR. All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

100-12 Noncompliance.

a. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.

b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:

(1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or

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

METHOD OF MEASUREMENT

100-13 Basis of measurement and payment. Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments:

a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop. QC/QA workshop will be paid 100% after completion under Line Item C-100b below.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 20%.

d. When 75% or more of the original contract is earned, an additional 20%.

e. After final inspection and acceptance of project, the final 10%.

BASIS OF PAYMENT

100-14 Payment will be made under:

Item C-100a	Contractor Quality Control Program
Item C-100b	Contractor Quality Control Workshop

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

END OF ITEM C-100

Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control

102-1. Description. This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

This project is subject to the terms and conditions of Arizona Pollutant Discharge Elimination System (AZPDES) General Permit No. AZG2013-001 for Storm Water Discharges from Construction Activities. Under the provisions of the AZPDES General Permit the Contractor shall be designated as the operator and must ensure compliance with the terms and conditions of the permit. AZPDES General Permit No. AZG2013-001 was issued by the Arizona Department of Environmental Quality (ADEQ) in May of 2013.

Work under this item shall consist of preparing all required documents and certifications, performing inspections, and furnishing all materials, labor, and equipment necessary to comply with all requirements of AZPDES General Permit No. AZG2013-001 for Storm Water Discharges from Construction Activities. The work shall also include providing, installing, maintaining, removing and disposing of erosion and sediment control measures such as gravel filter berms, dikes, catch basin inlet protection, end-of pipe filtering devices, silt fences, dams, sediment traps and basins, netting, straw bale barriers, slope drains, and other erosion control devices or methods.

102-2. Permit requirements. Please note that the terms and conditions of AZPDES General Permit No. AZG2013-001, except to the extent that more explicit or more stringent requirements are written directly into the contract documents, have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

The Contractor is designated as operator of the construction site and must complete a Notice of Intent (NOI) and be listed on the NOI and the Storm Water Pollution Prevention Plan (SWPPP) to comply with the terms and conditions of AZPDES General Permit No. AZG2013-001 for Storm Water Discharges from Construction Activities. The NOI must be signed by the contractor in accordance with the signatory requirements of the AZPDES General Permit, and must contain all required eligibility certifications. The Contractor will ensure that the signed NOI is submitted to ADEQ.

It shall be the responsibility of the Contractor to prepare a SWPPP and ensure its compliance with the minimum conditions of the AZPDES General Permit, including measures to protect impaired or unique waters, measures to protect threatened and/or endangered species, and measures to protect properties eligible for protection under the National Historic Preservation Act. The SWPPP must reflect the

Contractor's entire scope of activities at the job site as anticipated for the duration of the construction activities. The Contractor must indicate in the SWPPP those changes in job site requirements and for the order of work performance that will require modifications to the SWPPP, and include those modifications in the SWPPP.

Once completed, it shall be the responsibility of the RPR to review and approve the SWPPP prior to the start of work. The preconstruction conference shall not be held and the Contractor shall not be allowed to start work until the RPR has approved the SWPPP as being adequate and in accordance with the requirements of the AZPDES General Permit. The RPR shall approve or not approve the SWPPP within seven (7) calendar days after receipt of the SWPPP from the Contractor for purposes of review. Failure of the Contractor and the RPR to reach agreement on the adequacy of the SWPPP prior to the preconstruction conference will delay the start of work. The Contractor shall not be entitled to additional compensation for costs that result from such delay in the construction start date.

The SWPPP is not to be submitted to the ADEQ unless directed to do so by the RPR or in response to a direct request from the ADEQ Director (or authorized representative). If the SWPPP must be submitted to the ADEQ for review and approval, authorization to discharge under the AZPDES General Permit may be withheld by ADEQ for up to thirty-two (32) business days after receipt of the SWPPP.

It shall be the responsibility of the Contractor to implement the SWPPP, and ensure day-to-day compliance with the terms and conditions of the SWPPP and the AZPDES General Permit. The Contractor shall, with the approval of the RPR, update and revise the SWPPP as necessary throughout the duration of the project to ensure compliance with the AZPDES General Permit requirements.

The Contractor shall retain a copy of the SWPPP and the AZPDES General Permit at a central location on the job site for the use of all operators whenever they are on the construction site. A copy of the signed SWPPP must be retained on the construction site or at another location easily accessible during normal working hours.

All subcontractors and construction site operators having control over only a portion of the construction site shall comply with the requirements of the AZPDES General Permit and the common SWPPP under the supervision of the Contractor. The Contractor shall ensure that all partial site operators having day-to-day operational control of activities necessary to ensure compliance with the SWPPP or other permit requirements submit NOIs to ADEQ as required by the AZPDES General Permit. Subcontractors and partial site operators shall ensure that their activities do not render any other party's pollution prevention plan measures ineffective.

The Contractor shall obtain and incorporate into the SWPPP copies of all NOIs required by the AZPDES General Permit. The Contractor shall ensure that all required documents are complete and accurate, and all required NOIs are received by ADEQ at least two (2) business days before a contractor, subcontractor, or partial site operator is allowed to perform any work at the construction site.

The Contractor shall submit the Contractor's completed and signed NOI form to the ADEQ at the following address:

Arizona Department of Environmental Quality
Surface Water Section – Stormwater General Permits Unit
1110 West Washington Street
Phoenix, Arizona 85007

Or fax to (602) 771-4528

The Contractor shall provide a copy of the Contractor's completed and signed NOI form to the RPR at the preconstruction conference. The Contractor shall ensure that a copy of the Contractor's completed NOI form is incorporated into the SWPPP. The Contractor must submit the NOI to the RPR if so directed by the RPR.

Failure by the Contractor to provide copies of the required completed NOI forms by the time of the preconstruction conference shall cause a delay in the construction start date. The Contractor shall not be entitled to additional compensation for costs that result from such delay in the construction start date.

The Contractor must submit an amended NOI if ADEQ provides notification that the previously submitted NOI is incomplete. The amended NOI must be submitted to the ADEQ, the City of Mesa, and if so directed by the City of Mesa, to the City of Mesa.

The Contractor may assume coverage under the AZPDES General Permit two (2) business days after receipt of the NOI by ADEQ; unless ADEQ provides notification that the NOI needs additional evaluation. Such notification may be made in writing, electronically, by fax, or by phone; and will typically be made within two (2) business days after receipt of the NOI. The Contractor cannot assume coverage under the permit and must delay the start of construction for a period of thirty- two (32) business days after receipt of the NOI by ADEQ, unless additional notice is received from ADEQ during this time period. If there is no additional notice, the Contractor may assume coverage under the AZPDES General Permit and initiate construction activities at the end of the 32 business days.

102-3. Storm Water Pollution Prevention Plan (SWPPP) requirements. The SWPPP must be prepared prior to submitting the NOl to ADEQ for coverage under AZPDES General Permit, and the Contractor must implement the SWPPP as written from the initial commencement of construction activity until final stabilization is complete. A Draft SWPPP Plan Template is included in the project plans for use by the Contractor in preparing the final SWPPP.

The SWPPP must be prepared in accordance with good engineering practice, and must:

a. Identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site;

b. Identify, describe and ensure implementation of best management practices (BMPs) that will be used to reduce the amount of pollutants in storm water discharges from the construction site;

c. Assure compliance with the terms and conditions of AZPDES General Permit No. AZG2013- 001 for Storm Water Discharges from Construction Activities; and

d. Identify the party responsible for on-site implementation of the SWPPP.

Specific requirements for the contents of the SWPPP include identification of all operators of the project site, and the areas over which each operator has control. The SWPPP must also provide a description of the nature of the construction activity that includes:

a. A description of the project and its intended use after the Notice of Termination (NOT) is filed (e.g. a municipal park, a municipal building, high density housing, a city street, a water treatment plant, a municipal airport, etc.);

b. A description of the intended sequence of activities that disturb the soil at the site (e.g. grubbing, excavation, grading, utilities, infrastructure installation, etc.);

c. The total area of the site, and an estimate of the total area of the site expected to be disturbed by excavation, grading, or other activities, including off-site barrow and fill areas;

d. An estimate of the runoff coefficient of the site for both the pre-construction and post-construction conditions, and data describing the soil and any existent data on the quality of any discharge from the site;

e. A general location map (e.g. U.S.G.S quadrangle map, a portion of a city or county map, or other map) with enough detail to identify the location of the construction site and the receiving waters within one mile of the site.

The SWPPP must contain a legible site map completed to scale that shows the entire site, and identifies:

a. The directions of storm water flow (e.g. use arrows to show which way or ways storm water will flow on, through, and off the site), and the approximate slopes anticipated after major grading activities;

b. Areas of soil disturbance and areas of no soil disturbance;
c. Locations of structural and non-structural controls identified in the SWPPP;
d. Locations where stabilization practices are expected to occur;
e. Locations of off-site material, waste, borrow areas, or equipment storage areas;
f. Locations of all surface water bodies (including wetlands);
g. Locations where storm water discharges to surface water (including dry washes) and to the City's storm sewer system;
h. Locations and registration numbers of on-site drywells;
i. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

The SWPPP must identify the nearest receiving water or waters, including ephemeral and intermittent streams, dry sloughs, and arroyos. If applicable, the SWPPP must also identify the area and extent of, and describe any wetlands near the site that could be disturbed or that could potentially receive discharges from the disturbed areas of the project.

The SWPPP must identify the location and describe any storm water or non-storm water discharges at the site associated with activity other than construction and other pollutant sources, such as fueling operations, on-site material storage areas, waste piles, etc. This includes discharges from dedicated asphalt plants and dedicated concrete plants that are covered by the AZPDES General Permit.

The SWPPP must identify and address off-site storage areas or borrow areas that are used solely for this construction project.

The SWPPP must describe all pollution control measures that will be implemented as part of the construction project to control pollutants in storm water discharges. For each major activity identified in the project description, the SWPPP must clearly describe appropriate control measures; the general sequence during the construction process when the measures will be implemented; and identify the construction site operator responsible for the implementation of the described control measures.

Off-site material storage areas (including overburden and stockpiles of dirt, borrow areas, etc.) used solely by the Contractor for the permitted construction project are considered a part of the project and must be addressed in the SWPPP.

For purposes of controlling erosion and sediment, the SWPPP must address the following:
a. Erosion and sediment controls must be designed to retain sediment on the construction site to the extent practicable.
b. All control measures must be properly selected, installed, and maintained per the manufacturer's specifications and good engineering practices. If periodic inspections or information is discovered that indicates a control has been used inappropriately, or installed incorrectly, the Contractor must replace or modify the control for site situations as soon as practicable and before the next anticipated storm event.
c. When sediment escapes the construction site, off-site accumulations of sediment must be routinely removed at a frequency sufficient to ensure no adverse effects on water quality.

The SWPPP must describe good housekeeping procedures to prevent litter, construction debris, and construction chemicals exposed to storm water from becoming a pollutant source for storm water discharges.

The SWPPP must include a description of and identify interim and permanent stabilization practices for the construction site, including a schedule of when the practices will be implemented. The SWPPP shall document those areas where existing vegetation will be preserved.

The Contractor must initiate stabilization measures within 14 calendar days in those areas where construction activities have temporarily or permanently ceased, except:

a. Where stabilization by the 14th day is precluded by frozen ground conditions, stabilization measures must be initiated as soon as practicable.
b. Where construction activity on a portion of the site has temporarily ceased, but earth disturbing activities will resume in that area within the 14 days. In this event, temporary stabilization measures do not have to be initiated on that portion of the site.
c. When the site is using vegetative stabilization measures and it is during seasonally arid conditions, vegetative stabilization measures must be initiated as soon as practicable.

The Contractor must maintain the following records as part of the SWPPP:
a. Dates when major grading activities occur;
b. Dates when construction activities temporarily or permanently cease on a portion of the site;
c. Dates when stabilization measures are initiated and completed, and the reasons for any delay.

The SWPPP must describe structural practices to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Placement of structural practices in floodplains should be avoided to the degree attainable. A combination of sediment and erosion control measures is required to achieve maximum pollutant removal. Sediment basins and velocity dissipation devices must be utilized and placed in accordance with Part 3.1.1 of the AZPDES General Permit.

The SWPPP must include a description of post-construction storm water management measures that will be installed during the construction process to control pollutants in storm water discharges after construction operations have been completed. Structural measures shall be placed on upland soils to the degree attainable, and must be designed and installed consistent with applicable City of Mesa storm water management requirements.

The SWPPP must identify all allowable sources of non-storm water discharges listed in Part 1.3.2 of AZPDES General Permit No. AZG2013-001 for Storm Water Discharges from Construction Activities except for flows from fire fighting activities. Non-storm water discharges are to be eliminated or reduced to the extent feasible. The Contractor must implement appropriate best management practices (BMPs) to minimize pollutants in any non-storm water discharges, and must describe those BMPs in the SWPPP. Except if used in emergency firefighting, super- chlorinated wastewaters must be held on-site until the chorine dissipates, or otherwise dechlorinated prior to discharge.

The SWPPP must describe:
a. Measures to prevent the discharge of solid materials, including building materials, to waters of the United States, except as authorized by a permit issued under section 404 of the Clean Water Act;
b. Measures to minimize off-site vehicle tracking of sediments, to the extent practicable, and the generation of on-site dust.
c. Construction and waste materials expected to be stored on-site with updates as appropriate. The SWPPP must also include a description of the controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention and response practices;
d. Any pollutant sources from areas other than construction (including storm water discharges from dedicated asphalt plants, dedicated concrete plants, and/or any other non- construction pollutant sources), with details of controls and measures that will be implemented at those sites to minimize pollutant discharges; and
e. Measures to sufficiently stabilize soil at culvert locations to prevent the formation of rills and gullies during construction.

The SWPPP must include a copy of AZPDES General Permit No. AZG2013-001 for Storm Water Discharges from Construction Activities. Copies of the NOIs submitted to ADEQ and/or copies of the certificates received from ADEQ specifying the authorization numbers must also be incorporated into the SWPPP as they become available. If any other agreements with state, federal, or local officials exist that

would affect the provisions or implementation of the SWPPP, copies of these agreements must also be included in the SWPPP. (Please note: these types of agreements would include grading and drainage approvals and/or permits, and storm water management approvals and/or permits issued by the City of Mesa.)

The SWPPP must be consistent with applicable federal, state, and local requirements for soil and erosion control or storm water management. The SWPPP may incorporate by reference the appropriate elements of soil and erosion or storm water management plans required by other agencies. A copy of these requirements incorporated by reference must be provided as an attachment to the SWPPP, and must be updated as necessary to remain consistent with any revisions made to the requirements by the responsible agency or agencies.

A schedule for routine inspections of the construction site must be included in the SWPPP. This schedule must comply with Part 4 of the AZPDES General Permit.

The Contractor must sign the SWPPP in accordance with the AZPDES General Permit. A copy of the signed SWPPP must be retained on the construction site or at another location easily accessible during normal working hours.

CONSTRUCTION REQUIREMENTS

102-4.1. Construction requirements. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

102-4.2. Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

102-4.3. SWPPP implementation and construction requirements. The Contractor shall not begin any construction activity until all applicable SWPPP controls, devices, and practices have been put into place.

In accordance with the terms and conditions of the AZPDES General Permit, the Contractor shall post the following documents at the construction site near the main entrance:

a. The AZPDES authorization number for the project or a copy of the NOl if an authorization number has not yet been assigned,

b. The name and telephone number of a local office or site contact person,

c. A brief description of the construction project, and

d. The location of the SWPPP if the site is inactive or does not have an on-site location to store the plan, and the name of the contact person for accessing the SWPPP.

The Contractor shall provide adequate and timely maintenance of vegetation, erosion and sediment control measures, and other protective measures and/or best management practices (BMPs) identified in the site plan or SWPPP to ensure that they remain in effective operating condition. Maintenance needs identified through inspections or other means shall be accomplished as soon as practicable and before the next anticipated storm event. If existing protective measures need to be modified or additional measures added, implementation of these changes must be completed before the next anticipated storm event, if practicable. If not practicable, implementation must be completed as soon as it is practicable. Sediment

and debris must be removed from sediment traps, sediment ponds, trash racks, and similar structures when the design capacity of the structure has been reduced by fifty (50) percent.

The Contractor shall employ qualified personnel as defined by Part 4.1 of the AZPDES General Permit to inspect construction site areas in accordance with the requirements of the AZPDES General Permit. All inspection results shall be documented in reports that, at a minimum, include:

a. The inspection date;

b. The name, title, and qualifications of the person or persons performing the inspection. The qualifications must be either on or attached to the report. Alternatively, if the SWPPP documents the qualifications of the person or persons performing the inspection, then that portion of the SWPPP may be referenced;

c. The weather information for the period since the last inspection (or since the start of construction if this is the first inspection), including the best estimate of the beginning of each storm event, the duration of each event, the time that has elapsed since the last storm event, and the approximate amount of rainfall for each event in inches;

d. The location or locations of discharges of sediment or other pollutants from the site; Airport;

e. The location or locations and identification of BMP's that need to be maintained, failed to operate as designed, or proved inadequate;

f. The location or locations where additional BMP's that do not exist at the time of the inspection need to be implemented;

g. Any corrective actions required, including any changes to the SWPPP that are needed, and the dates for implementation;

h. Identification of all sources of non-storm water and their associated pollution prevention control measures; and

i. Identification of material storage areas, and any evidence of or potential for pollutant discharge from such areas.

The Contractor must retain the inspection reports and any records of follow-up actions taken for a period of at least three (3) years from the date permit coverage expires or is terminated. Inspection reports must identify any instance of non-compliance with the terms and conditions of the AZPDES General Permit. Where no instance of non-compliance is identified, the report must contain a certification that the construction project or site is being operated in compliance with the SWPPP and AZPDES General Permit No. AZG2013-001. The report shall be signed in accordance with Appendix B of the permit. Copies of all inspection reports shall be provided to the City of Mesa at least once each month throughout the duration of the project.

Based on the results of the inspection, the Contractor must modify the SWPPP to include additional or modified BMPs designed to correct problems identified. These revisions must be completed within seven (7) calendar days following the inspection. If existing BMPs need to be modified, or if additional BMPs are needed, implementation must be completed before the next anticipated storm event. If implementation before the next anticipated storm event is not practicable, implementation must occur as soon as it is practicable.

The Contractor, with the approval of the City of Mesa, must amend the SWPPP within fifteen (15) business days whenever:

1. There is a change in design, construction, operation, or maintenance at the construction site that has a significant effect on the discharge of pollutants to the waters of the United States, and such effect has not been previously addressed in the SWPPP; or
2. Inspections, monitoring (if required), or investigations by the Contractor, the City of Mesa, state officials, or federal officials determine the discharges are causing or contributing to water quality exceedances, or the SWPPP is ineffective in eliminating or significantly minimizing pollutants in storm water discharges from the construction site.

The SWPPP and all reports required under this contract shall be available to the public in accordance with the requirements of section 308b. of the Clean Water Act. The Contractor shall make plans and reports available upon request to the ADEQ Director (or authorized representative); State, Tribal, or local agency with Engineer approval for sediment and erosion control plans, grading plans, or storm water management plans; local government officials; or to the operator of a municipal separate storm sewer receiving discharges from the site in accordance with the terms and conditions of the AZPDES General Permit.

The ADEQ Director (or authorized representative) may notify the Contractor and/or the City of Mesa at any time that the SWPPP is inadequate, or does not meet one or more of the requirements of Part IV of AZPDES General Permit. Within fifteen (15) business days of receipt of such notification from ADEQ (or as otherwise provided by ADEQ), the Contractor must make the required changes to the SWPPP and submit to the ADEQ a written certification that the requested changes were made and implemented. The ADEQ may request submittal or re-submittal of the SWPPP to verify that all deficiencies have been adequately addressed.

No condition of the AZPDES General Permit or the SWPPP shall release the Contractor from any responsibilities or requirements under any other environmental statutes or regulations, including requirements for the prevention or minimization of the discharge of hazardous substances or oil. If there is a release containing a hazardous substance or oil in an amount equal to or greater than the reportable quantities established under federal regulations that has the potential to impact storm water discharges from this site, the Contractor must report the release to the regulatory agencies in accordance with regulatory requirements. In addition, the Contractor must modify the SWPPP within fourteen (14) calendar days after gaining knowledge of the release to provide a description of the release, the circumstances leading to the release, and the date of the release. The SWPPP must identify measures to minimize and/or prevent the occurrence of such releases, and appropriate measures for responding to such releases. The AZPDES General Permit does not authorize the discharge of any substance resulting from on-site spills, or the discharge of oil or chemicals.

The SWPPP (including a copy of AZPDES General Permit No. AZG2013-001) shall be kept on the project site from the date of commencement of construction activities to the date of submittal of the Notice of Termination (NOT). A copy of the SWPPP and the permit shall be retained by the Contractor for a period of at least three (3) years following the date of final stabilization of the construction site. The Contractor shall also retain for the same three-year period all reports required by the AZPDES General Permit and all records of data used to complete the NOI.

It shall be the responsibility of the Contractor to ensure that copies of all documents and records retained by the Contractor in accordance with requirements of the AZPDES permit are also provided to the City of Mesa.

Within thirty (30) days of the date of final stabilization of the construction site, the Contractor shall submit a completed and properly signed Notice of Termination (NOT) form to the City of Mesa. The contractor shall submit the NOT to the ADEQ address specified on the NOT form; thereby terminating the Contractor's AZPDES permit coverage for the project. Copies of the NOT will also be sent to those agencies that received a copy of the NOI. A blank NOT form is enclosed with these project specifications for use by the Contractor.

DUST CONTROL

102.5.1. General. The Contractor shall obtain an Earthmoving Permit, non-pay item incidental to work, from the Maricopa County Air Quality Division which must be renewed on an annual basis. The Contractor shall also furnish all labor, equipment and means required to carry out effective measures wherever and as often as necessary to prevent his operations from producing dust in amounts damaging to

property, cultivated vegetation and domestic animals, or which would cause a nuisance to persons living or occupying buildings in the vicinity. Airborne dust shall not exceed 20 percent visible emissions as stipulated by Rules 300 and 310 of the Maricopa County Air Pollution Control Rules and Regulations. The Contractor shall be responsible for any damage resulting from any dust originating from activities on or around the excavation sites. Dust abatement measures shall be continued until the Contractor has met the requirements of the County ordinance and is relieved of further responsibility by the City of Mesa. This dust abatement program shall include provisions to prevent excessive airborne dust in levels determined to be detrimental to aircraft operations by the City of Mesa or airport representatives. Contractor's operations may be halted if aircraft operations are determined to be unsafe. The Contractor shall take the following measures, at a minimum, to control and prevent a dust problem:

1. To control dust on roadways, stockpiles and around the site, the areas shall be treated, as required, with dust suppressants approved by the City of Mesa.
2. Temporary access roads shall be planned so travel on unpaved roads is minimized.
3. Multiple vacuum sweepers shall be required on all paved access roads for dust control.

A Dust Control Plan shall be submitted at the Pre-construction Conference. The plan should include a description of the equipment required, manpower and methods for dust control. Any chemical additives used must be approved by the project Environmental representative. The Contractor shall also address in the Dust Control Plan, a method to keep public thoroughfares free of mud, dust and debris at all times.

102-5.2. Site preparation. The Contractor shall use water trucks at all times to minimize dust to supplement other control measures. The Contractor shall cover trucks when hauling materials, and shall stabilize the surface of stockpiles when not relocating immediately.

102-5.3. Construction. The Contractor shall provide a copy of the Air Quality Management Plan/Dust Control Plan to all adjacent site contractors and subcontractors. The Contractor must also post a copy of the Air Quality Management Plan/Dust Control Plan in a weather resistant location at the construction site where it may be seen by the workers.

The Contractor shall cover trucks when transferring materials and shall use dust suppressants as stated in Item P-160 on traveled paths, construction parking and staging areas that are fine grained materials and not paved. The Contractor shall also minimize unnecessary vehicular and machinery activities to reduce dust and shall minimize soil track-out on paved roads and streets by cleaning trucks and equipment before leaving non-paved roads.

102-5.4. Post construction. The Contractor shall stabilize non-paved areas and shall remove unused materials and stockpiles at the end of construction.

102-5.5. Construction details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and

embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

METHOD OF MEASUREMENT

102-6. A bid item for the Contractor's participation in the preparation of the Storm Water Pollution Prevention Plan (SWPPP), the implementation of the SWPPP, and the modification of the SWPPP as necessary for compliance with AZPDES General Permit No. AZG2013- 001 for the duration of this construction project is included in these contract documents. Payment shall be made monthly with equal payment during the entire construction period with any retention required by the terms and conditions of the construction contract to be paid after filing of the Notice of Termination (NOT).

No separate measurement or direct payment will be made for preparing the Notice of Intent (NOl), the Notice of Termination (NOT), Inspection and Maintenance Reports, or other documentation required to perform the work, the cost being considered as included in the allowance.

BASIS OF PAYMENT

102-7. Payment will be made under:

Item C102-601 AZPDES Permit Compliance and SWPPP

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33	*Hazardous Wildlife Attractants on or Near Airports*
AC 150/5370-2	*Operational Safety on Airports During Construction*

ASTM International (ASTM)

ASTM D6461 *Standard Specification for Silt Fence Materials*

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

Item C-105 Mobilization

105-1 Description. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 Mobilization limit. Mobilization shall be limited to 10 percent of the total project cost.

105-3 Posted notices. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 Engineer/RPR field office. An Engineer/RPR field office is not required.

METHOD OF MEASUREMENT

105-5 Basis of measurement and payment. Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

a. With first pay request, 25%.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 40%.

d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, Contractor Final Project Documentation, the final 10%.

BASIS OF PAYMENT

105-6 Payment will be made under:

Item C-105	Mobilization

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

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Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

110-1 General. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (X) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-2 Method for computing PWL. The computational sequence for computing PWL is as follows:

a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.

b. Locate the random sampling position within the sublot in accordance with the requirements of the specification.

c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.

d. Find the sample average (X) for all sublot test values within the lot by using the following formula:

$$\mathbf{X = (x_1 + x_2 + x_3 + \ldots x_n) / n}$$

Where: X = Sample average of all sublot test values within a lot

$x_1, x_2, \ldots x_n$ = Individual sublot test values

n = Number of sublot test values

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

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

Where: S_n = Sample standard deviation of the number of sublot test values in the set

$d_1, d_2, \ldots d_n$ = Deviations of the individual sublot test values $x_1, x_2, \ldots$ from the average value X

that is: $d_1 = (x_1 - X)$, $d_2 = (x_2 - X) \ldots d_n = (x_n - X)$

n = Number of sublot test values

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

$$\mathbf{Q_L = (X - L) / S_n}$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with Q_L, using the column appropriate to the total number (n) of measurements. If the value of Q_L falls between values shown on the table, use the next higher value of PWL.

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

$$\mathbf{Q_L = (X - L) / S_n}$$
$$\mathbf{and}$$
$$\mathbf{Q_U = (U - X) / S_n}$$

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

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U, using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U. Determine the PWL by use of the following formula:

$$\mathbf{PWL = (P_U + P_L) - 100}$$

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

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

A-1 = 96.60

A-2 = 97.55

A-3 = 99.30

A-4 = 98.35

n = 4

2. Calculate average density for the lot.

$X = (x_1 + x_2 + x_3 + . . . x_n) / n$
$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$
$X = 97.95\%$ density

3. Calculate the standard deviation for the lot.

$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2)) / (4 - 1)]^{1/2}$
$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$
$S_n = 1.15$

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

$Q_L = (X - L) / S_n$
$Q_L = (97.95 - 96.30) / 1.15$
$Q_L = 1.4348$

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

PWL = 98

B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.

A-1 = 5.00
A-2 = 3.74
A-3 = 2.30
A-4 = 3.25

2. Calculate the average air voids for the lot.

$X = (x_1 + x_2 + x_3 . . . n) / n$
$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$
$X = 3.57\%$

3. Calculate the standard deviation S_n for the lot.

$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$
$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$
$S_n = 1.12$

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

$Q_L = (X - L) / S_n$
$Q_L = (3.57 - 2.00) / 1.12$
$Q_L = 1.3992$

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

$P_L = 97$

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

$Q_U = (U - X) / S_n$
$Q_U = (5.00 - 3.57) / 1.12$

$Q_U = 1.2702$

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

$P_U = 93$

8. Calculate Air Voids PWL

$PWL = (P_L + P_U) - 100$

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

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

Project: Example Project

Test Item: Item P-401, Lot A.

A. Outlier Determination for Mat Density.

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

A-3 = 99.30

A-4 = 98.35

A-2 = 97.55

A-1 = 96.60

2. From ASTM E178, Table 1, for n=4 an upper 5% significance level, the critical value for test criterion = 1.463.

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

a. For measurements greater than the average:

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

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

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

b. For measurements less than the average:

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

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

Since 1.435 is less than 1.463, the value is not an outlier.

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

Greater than (97.95 + 1.463 × 1.15) = 99.63%

OR

less than (97.95 - 1.463 × 1.15) = 96.27%.

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

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630

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

Percent Within Limits (P_L and P_U)	Negative Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042

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

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM E178 Standard Practice for Dealing with Outlying Observations

END OF ITEM C-110

TECHNICAL SPECIFICATIONS

PROJECT NAME: MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

Schedule I
Realignment of Taxiways D7 and D8

Schedule II
Midfield Crossover Taxiway East

Schedule III
Install Airfield Lighting Control and Monitoring System (ALCMS)

AIP Project No. 3-04-0023-035-2023
City of Mesa Design Project No. CP0994East

Falcon Field Airport
Mesa, Arizona

mesa·az
FALCON FIELD AIRPORT

Sponsored By:

Federal Aviation Administration
Arizona Department of Transportation
City of Mesa

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ITEM P-101 PREPARATION/REMOVAL OF EXISTING PAVEMENTS

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.

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.

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. 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. Waste material shall be disposed of offsite. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by 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 2 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.

101-3.2 PREPARATION OF JOINTS AND CRACKS PRIOR TO OVERLAY/SURFACE TREATMENT. Remove all vegetation and debris from cracks to a minimum depth of 1 inch . If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by

the RPR. Fill all cracks greater than 1/4 inch wide with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch, not to exceed ¼ inch. Any excess joint or crack sealer shall be removed from the pavement surface.

Wider cracks over 1-1/2 inch wide, along with soft or sunken spots, indicate that the pavement or the pavement base should be repaired or replaced as stated below.

Cracks and joints may be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in the following table.

Up to 3% cement can be added to accelerate the set time. The mixture shall not contain more than 20% natural Gradation sand without approval in writing from the RPR.

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	90-100
No. 16 (1.18 mm)	65-90
No. 30 (600 μm)	40-60
No. 50 (300 μm)	25-42
No. 100 (150 μm)	15-30
No. 200 (75 μm)	10-20

The proportions of asphalt emulsion and aggregate shall be determined in the field and may be varied to facilitate construction requirements. Normally, these proportions will be approximately one part asphalt emulsion to five parts aggregate by volume. The material shall be poured or placed into the joints or cracks and compacted to form a voidless mass. The joint or crack shall be filled to within +0 to -1/8 inches of the surface. Any material spilled outside the width of the joint shall be removed from the pavement surface prior to constructing the overlay. Where concrete overlays are to be constructed, only the excess joint material on the pavement surface and vegetation in the joints need to be removed.

101-3.3 REMOVAL OF FOREIGN SUBSTANCES/CONTAMINATES PRIOR TO OVERLAY, SEAL-COAT OR REMARKING. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water, or sandblasting may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

101-3.4 CONCRETE SPALL OR FAILED ASPHALTIC CONCRETE PRAVEMENT REPAIR.

a. **Repair of concrete spalls in areas to be overlaid with asphalt.** The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The perimeter of the repair shall be saw cut a minimum of 2 inches outside the affected area and 2 inches deep. The deteriorated material shall be removed to a depth where the existing material is firm or cannot be easily removed with a geologist pick. The removed area shall be filled with asphalt mixture with aggregate sized appropriately for the depth of the patch. The material shall be compacted with equipment approved by the RPR until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches in depth. This method of repair applies only to pavement to be overlaid.

b. **Asphalt pavement repair.** The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

101-3.5 COLD MILLING. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport property. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.

a. **Patching.** The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The RPR shall layout the area to be milled with a straightedge in increments of 1-foot widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.

b. **Profiling, grade correction, or surface correction.** The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport.

c. **Clean-up.** The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. PREPARATION OF ASPHALT PAVEMENT SURFACES PRIOR TO SURFACE TREATMENT. Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

b. Repair joints and cracks in accordance with paragraph 101-3.2.

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 MAINTENANCE. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 PREPARATION OF JOINTS IN REIGID PAVEMENT PRIOR TO RESEALING. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the joint and does not damage the joint.

101-3.8.1 REMOVAL OF EXISTING JOINT SEALANT. All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

101-3.8.2 CLEANING PRIOR TO SEALING. Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

101-3.8.3 JOINT SEALANT. Joint material and installation will be in accordance with Item P-605.

101-3.9 PREPARATION OF CRACKS IN FLEXIBLE PAVEMENT PRIOR TO SEALING. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 PREPARATION OF CRACK. Widen crack with router or random crack saw by removing a minimum of 1/16 inch from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 REMOVAL OF EXISTING CRACK SEALANT. Existing sealants will be removed by routing or random crack saw. Following routing or sawing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 CRACK SEALANT. Crack sealant material and installation will be in accordance with Item P-605.

101-3.9.4 REMOVAL OF PIPE AND OTHER BURIED STRUCTURES.

a. **Removal of Existing Pipe Material.** Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D1557.

b. **Removal of Inlets/Manholes.** Where indicated on the plans or as directed by the RPR, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D1557, when outside of paved areas must be compacted to 95% of ASTM D698.

METHOD OF MEASUREMENT

101-4.1 SAWCUT. The unit of measurement shall for saw cutting shall be the number of linear feet sawcut by the contractor and accepted by the RPR. Any saw cutting outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment.

101-4.2 PAVEMENT REMOVAL. The unit of measurement for pavement removal shall be the number of square yards removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. Dowel bar installation shall be incidental to pavement removal.

101-4.7 REMOVAL OF PIPE AND OTHER BURIED STRUCTURES. The unit of measurement for removal of pipe and other buried structures will be made at the contract unit price for each completed and accepted item. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.9.4.

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-101a	Sawcut Asphalt Pavement (4")
Item P-101b	Sawcut Asphalt Pavement (2")
Item P-101c	Asphalt Pavement Removal (Full Depth, 4") – per square yard
Item P-101d	Asphalt Pavement Removal (Full Depth, 2") – per square yard
Item P-101e	Asphalt Pavement Removal (Partial Depth, 2") – per square yard
Item P-101f	Remove Storm Sewer Pipe – per linear feet
Item P-101g	Remove Inlet/Outlet with grate – 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.

Advisory Circulars (AC)

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

****END OF ITEM P-101****

ITEM P-151 CLEARING AND GRUBBING

DESCRIPTION

151-1.1 This item shall consist of clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the Resident Project Representative (RPR).

a. **Clearing** shall consist of the cutting and removal of all trees, stumps, brush, logs, hedges, the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.

b. **Clearing and grubbing** shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the RPR is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

c. **Tree Removal.** Tree Removal shall consist of the cutting and removal of isolated single trees or isolated groups of trees, and the grubbing of stumps and roots. The removal of all the trees of this classification shall be in accordance with the requirements for the particular area being cleared.

CONSTRUCTION METHODS

151-2.1 GENERAL. The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the Contractor as indicated on the plans.

The removal of existing structures and utilities required to permit orderly progress of work shall be accomplished by local agencies, unless otherwise shown on the plans. Whenever a telephone pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated, the Contractor shall advise the RPR who will notify the proper local authority or owner to secure prompt action.

151-2.1.1 DISPOSAL. All materials removed by clearing or by clearing and grubbing shall be disposed of outside the Airport's limits at the Contractor's responsibility, except when otherwise directed by the RPR. As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction and all other materials not considered suitable for use elsewhere, shall be disposed of by the Contractor. In no case, shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the RPR and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits, the Contractor shall obtain and file with the RPR permission in writing from the property owner for the use of private property for this purpose.

151-2.1.2 BLASTING. Blasting shall not be allowed.

151-2.2 CLEARING. The Contractor shall clear the staked or indicated area of all materials as indicated on the plans. Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner. To minimize damage to trees that are to be left standing, trees shall be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be

removed. The trees, stumps, and brush shall be cut flush with the original ground surface. The grubbing of stumps and roots will not be required.

Fences shall be removed and disposed of as directed by the RPR. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a location designated by the RPR if the fence is to remain the property of a local owner or authority.

151-2.3 CLEARING AND GRUBBING. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials as indicated on the plans, shall be removed, except where embankments exceeding 3-1/2 feet (105 cm) in depth will be constructed outside of paved areas. For embankments constructed outside of paved areas, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off flush with the original ground and allowed to remain. Tap roots and other projections over 1-1/2 inches (38 mm) in diameter shall be grubbed out to a depth of at least 18 inches (0.5 m) below the finished subgrade or slope elevation.

Any buildings and miscellaneous structures that are shown on the plans to be removed shall be demolished or removed, and all materials shall be disposed of by removal from the site. The cost of removal is incidental to this item. The remaining or existing foundations, wells, cesspools, and like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet (60 cm) below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material that cannot be used in backfill shall be removed and disposed of at the Contractor's expense. The holes or openings shall be backfilled with acceptable material and properly compacted.

All holes in embankment areas remaining after the grubbing operation shall have the sides of the holes flattened to facilitate filling with acceptable material and compacting as required in Item P-152. The same procedure shall be applied to all holes remaining after grubbing in areas where the depth of holes exceeds the depth of the proposed excavation.

METHOD OF MEASUREMENT

151-3.1 Clearing and Grubbing shall be considered incidental and no separate measurement shall be made.

BASIS OF PAYMENT

151-4.2 Clearing and grubbing shall be considered incidental and no separate payment shall be made.

Payment will be made under:

No Pay items

****END OF ITEM P-151****

ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 CLASSIFICATION. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature which is not otherwise classified and paid for under one of the following items.

152-1.3 UNSUITABLE EXCAVATION. Unsuitable material shall be disposed off site. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

CONSTRUCTION METHODS

152-2.1 GENERAL.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 EXCAVATION. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and

measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. **Selective grading.** When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. **Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard (per cubic meter) for Unclassified Excavation. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as Unclassified Excavation.

c. **Over-break.** Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. **Removal of utilities.** The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. Borrow areas are not required.

There are no borrow sources within the boundaries of the airport property. The Contractor shall locate and obtain borrow sources, subject to the approval of the RPR. The Contractor shall notify the RPR at least 15 days prior to beginning the excavation so necessary measurements and tests can be made by the RPR. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant.

152-2.4 DRAINAGE EXCAVATION. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 PREPARATION OF CUT AREAS OR AREAS WHERE EXISTING PAVEMENT HAS BEEN REMOVED. In those areas on which a subbase or base course is to be placed, or under any areas to be paved, the top 8 inches (200 mm) of subgrade shall be compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 PREPARATION OF EMBANKMENT AREA. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 CONTROL STRIP. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 FORMATION OF EMBANKMENTS. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The RPR will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the RPR for every 1,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D1557. Under all areas to be paved, the embankments shall be compacted to a depth of 8 inches and to a density of not less than 95% percent of the maximum density as determined by ASTM D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches (100 mm) which shall be prepared for a seedbed in accordance with Item T-901.

The in-place field density shall be determined in accordance with ASTM D1556. ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938.

The RPR shall perform all density tests. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

152-2.9 PROOF ROLLING. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. After compaction is completed, the subgrade area shall be proof rolled with a 20 ton (18.1 metric ton) Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi (0.689 MPa MPa) in the presence of the RPR. Apply a minimum of 75% coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

152-2.10 COMPACTION REQUIREMENTS. The subgrade under areas to be paved shall be compacted to a depth of 8 inches (200 mm) and to a density of not less than 95 percent of the maximum dry density as determined by ASTM D1557. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 8 inches (200 mm) and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

The material to be compacted shall be within –3% to +1% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, follow the methods in ASTM D1557for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of 1,000 S.Y. of subgrade. All quality assurance testing shall be done by the RPR.

The in-place field density shall be determined in accordance with ASTM D1556.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 FINISHING AND PROTECTION OF SUBGRADE. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 HAUL. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 SURFACE TOLERANCEs. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. **Smoothness.** The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. **Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/- 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 TOPSOIL. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item

T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard shall be computed by the average end areas of design cross sections for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the RPR.

152-3.1 The quantity of unclassified excavation to be paid for shall be the number of cubic yards measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.2 The quantity of embankment in place shall be the number of cubic yards measured in its final position.

152-3.3 Stockpiled material shall not be measured for payment in the stockpiled position.

BASIS OF PAYMENT

152-4.1 Unclassified excavation payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 For embankment in place, payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-152a	Unclassified Excavation - per cubic yard
Item P-152b	Unclassified Excavation for Subgrade (8” depth) – per cubic yards
Item P-152c	Embankment for Undercut - per cubic 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.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software

Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils

****END OF ITEM P-152****

Item P-153 Controlled Low-Strength Material (CLSM) 3721

DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

153-2.1 Materials.

a. Cement. Cement: ASTM C150 Type I, II, or V; ASTM C595, Types IS, IP, IL, or IT.

b. Fly ash. Fly ash shall conform to ASTM C618, Class C or F.

c. Fine aggregate (sand). Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by weight
3/4 inch (19.0 mm)	100
No. 200 (75 μm)	0 - 12

d. Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

MIX DESIGN

153-3.1 Proportions. The Contractor shall submit, to the RPR, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced for payment until the RPR has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. Compressive strength. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi (690 to 1379 kPa) when tested in accordance with ASTM D4832, with no significant strength gain after 28 days.

b. Consistency. Design CLSM to achieve a consistency that will produce an approximate 8-inch (200 mm) diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

CONSTRUCTION METHODS

153-4.1 Placement.

a. Placement. CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be

performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the RPR. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. Contractor Quality Control. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and 153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the RPR.

c. Limitations of placement. CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C).

153-4.2 Curing and protection

a. Curing. The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the RPR if damage to the material is observed.

b. Protection. The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the RPR that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 Quality Assurance (QA) Acceptance. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the RPR to confirm that the delivered material conforms to the mix design.

METHOD OF MEASUREMENT

153-5.1 Measurement.

No separate measurement for payment shall be made for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

BASIS OF PAYMENT

153-6.1 Payment.

No payment will be made separately or directly for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

Payment will be made under:

No pay items under P-153

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders

115 ****END OF ITEM P-153****

ITEM P-159 WATERING

DESCRIPTION

159-1.1 This item shall consist of furnishing and applying water required in the compaction of embankments, subgrades, subbases, base courses, for concrete and for other purposes in accordance with the requirements of these specifications or as designated by the Engineer.

MATERIALS

159-2.1 WATER SOURCES. Water is not available for construction purposes on the airport property. The Contractor shall obtain a suitable source of water off the airport property for his/her use in accomplishing the work.

159-2.2 WATER QUALITY FOR EARTHWORK. Water required in the compaction of embankments, subgrades, subbases and base courses shall be as clean and free of sewage, oil, strong alkalis, vegetable matter, and other substances injurious to the finished product as possible. Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, or other foreign materials.

CONSTRUCTION METHODS

159-3.1 GENERAL. Water shall be applied at the locations, in the amounts, and during the hours, including nights, as required, or as designated by the Engineer. An adequate water supply shall be provided by the Contractor. The equipment used for watering shall be of ample capacity and of such design as to assure uniform application of water in the amounts required.

159-3.2 HAUL. No payment will be made separately or directly for haul of water on any part of the work. All hauling will be considered a necessary and incidental part of the work, and its cost shall be considered by the Contractor and included in the contract unit price for the pay items of work involved.

METHOD OF MEASUREMENT

159-4.1 MEASUREMENT. No measurement will be made separately or directly for water on any part of the work.

BASIS OF PAYMENT

159-5.1 PAYMENT. No payment will be made separately or directly for water on any part of the work. All water will be considered a necessary and incidental part of the work and its cost shall be considered by the Contractor and included in the contract unit price for the pay items of work involved.

TESTING AND MATERIAL REQUIREMENTS

Test and Short Title	Material and Short Title
AASHTO T 2-Water	None

****END OF ITEM P-159****

ITEM P-208 AGGREGATE BASE COURSE

DESCRIPTION

208-1.1 This item shall consist of a base course composed of course aggregate bonded with fine aggregate base. It shall be constructed on a prepared subgrade or subbase course per these specifications and shall conform to the dimensions and typical cross-section shown on the plans.

MATERIALS

208-2.1 AGGREGATE BASE. The aggregate base material shall consist of both fine and coarse aggregate. Material shall be clean, sound, durable particles and fragments of stone or gravel, crushed stone, or crushed gravel mixed or blended with sand, screenings, or other materials. Materials shall be handled and stored in accordance with all federal, state, and local requirements. The aggregate shall be free from clay lumps, organic matter, or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as nearly constant and uniform as practicable. The fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve produced in crushing operations, shall be incorporated in the base material to the extent permitted by the gradation requirements. Aggregate base material requirements are listed in the following table.

AGGREGATE BASE MATERIAL REQUIREMENTS

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 50% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 60% by weight of particles with at least two fractured faces and 75% with at least one fractured face[1]	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles [2]	ASTM D4791
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

208-2.2 GRADATION REQUIREMENTS. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

GRADATION OF AGGREGATE BASE

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances for Contractor's Final Gradation[1] Percent
2 inch (50 mm)	100		±0
1-1/2 inch (37.5 mm)	70-100		±5
1 inch (25.0 mm)	55-85		±8
3/4 inch (19.0 mm)	50-80		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 (425 μm)	10-30		±5
No. 200 (75 μm)	5-15		±3

1 The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

208-2.3 SAMPLING AND TESTING.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraphs 208-2.1 and 208-2.2. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 208-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

208-2.4 SEPARATION GEOTEXTILE. Separation geotextile shall be Class 2, 0.02 sec^{-1} permittivity per ASTM D4491, Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

CONSTRUCTION METHODS

208-3.1 CONTROL STRIP. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.
Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been

accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

208-3.2 PREPARING UNDERLYING SUBGRADE AND/OR SUBBASE. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

208-3.3 PRODUCTION. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 208-3.5, the approved material may be transported directly to the placement.

208-3.4 PLACEMENT. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course layer shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

208-3.5 COMPACTION. Immediately upon completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with +/- 2%. The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as determined by ASTM D698. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

208-3.6 WEATHER LIMITATIONS. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

208-3.7 MAINTENANCE. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at their expense.

208-3.8 SURFACE TOLERANCES. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

208-3.9 ACCEPTANCE SAMPLING AND TESTING. Aggregate base course shall be accepted for density and thickness on an area basis. Two tests will be made for density and thickness for each 1200 square yards (1000 square meters). Sampling locations will be determined on a random basis per ASTM D3665.

a. **Density.** The RPR shall perform all density tests.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D698. The in-place field density shall be determined per ASTM D1556. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

208-4.1 The quantity of aggregate base course shall be measured by the number of cubic yards of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

BASIS OF PAYMENT

208-5.1 Payment shall be made at the contract unit price per cubic yard for aggregate base course. This price shall be full compensation for furnishing all materials and for all operations, hauling, placing, and compacting of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-208a	Aggregate Base Course (10" Thick)- 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.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile

ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)

M288	Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-208

ITEM P-222 SOIL STERILIZATION

DESCRIPTION

222-1.1 This work shall consist of furnishing and applying a soil sterilization chemical agent to prevent all plant growth in areas designated, or under new asphalt pavement and gravel shoulders.

MATERIALS

222-2.1 The soil sterilizing agent shall be:

a. A non-selective, pre- and post-emergent, soil toxic herbicide,

b. Active for 1 year after application,

c. Non-toxic to humans and animals when used under conditions designated by manufacturer.

The following table is a list of suggested herbicides to be used upon approval by the Engineer. The Contractor shall submit adequate information to allow the Engineer to make a determination on the acceptability of the proposed product. A minimum of 2 weeks is required for approval.

Chemical Designation	**Manufacturer**
Ureabor	U.S. Borax
Monobor Chlorate	U.S. Borax
Hyvar X	DuPont Chemical Co.

Other herbicides will be considered for approval if submitted to the Engineer at least 2 weeks prior to intended application.

CONSTRUCTION METHODS

222-3.1 All surface vegetation shall be removed from the area to be sterilized within 3 days prior to treating soil.

The soil sterilizer shall be applied according to the methods and precautions recommended by the manufacturer.

Treatment shall be made at a temperature of 70° F. or higher, or as designated by the manufacturer and approved by the Engineer.

The Contractor shall comply with all Arizona state statutes and EPA requirements, and all local ordinances and/or codes pertaining to the use, storage and application of fungicides, insecticides, herbicides or other agricultural chemicals.

The Contractor will be held responsible for any damages to plant growth outside the designated treatment areas, where such damage is attributable to carelessness or improper application of the soil sterilizer. Care shall be exercised to prevent powder, spray or vapors drifting which may damage crops, gardens, shrubs or trees in the vicinity of the areas being treated. Application shall be performed by licensed personnel trained in the use and handling of herbicides.

Soil sterilizers shall not be used where they may contaminate water used for irrigation or drinking purposes. Soil sterilizers shall not be applied more than 1 day prior to beginning paving operations.

METHOD OF MEASUREMENT

222-4.1 MEASUREMENT. The quantity of soil sterilization to be measured shall be the actual number of square yards treated in accordance with these specifications.

Water shall not be measured and paid for separately, but shall be incidental to this bid item.

BASIS OF PAYMENT

222-5.1 PAYMENT. The accepted quantities of soil sterilization measured as provided above shall be paid for at the contract unit price per square yard.

Payment will be made under:

P-222a Soil Sterilization – Square yard

****END OF ITEM P-222****

ITEM P-401 ASPHALT MIX PAVEMENT

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 AGGREGATE. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face[1]	ASTM D5821
	For pavements designed for aircraft gross weights less than 60,000 pounds (27200 kg): Minimum 50% by weight of particles with at least two fractured faces and 65% with at least one fractured face[1]	
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 [2]	ASTM D4791
Bulk density of slag [3]	Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter)	ASTM C29.

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

[3] Only required if slag is specified.

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate.

401-2.2 MINERAL FILLER. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral Filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

401-2.3 ASPHALT BINDER. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 70-10.

Asphalt Binder PG Plus Test Requirements

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084

401-2.4 ANTI-STRIPPING AGENT. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 COMPOSITION OF MIXTURE(S). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 JOB MIX FORMULA (JMF) LABORATORY. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

401-3.3 JOB MIX FORMULA (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.
When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.
The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition**.** Samples shall be prepared and compacted using a Marshall compactor in accordance with ASTM D6926.

Should a change in sources of materials be made, a new JMF must be submitted to the RPR for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the RPR and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the RPR, will be borne by the Contractor.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.

- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.

- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.

- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.

- Specific Gravity and absorption of each coarse and fine aggregate.

- Percent natural sand.

- Percent fractured faces.

- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations.
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows or gyrations	50	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR)[1]	not less than 75 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA)[2]	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

[1] Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

[2] AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve
1 inch (25.0 mm)	--
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 μm)	18-38
No. 50 (300 μm)	11-27
No. 100 (150 μm)	6-18
No. 200 (75 μm)	3-6
Minimum Voids in Mineral Aggregate (VMA)[1]	15.0
Asphalt Percent:	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
Recommended Minimum Construction Lift Thickness	2 inch

[1]To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.4 RECLAIMED ASPHALT PAVEMENT (RAP). RAP shall not be used.

401-3.5 CONTROL STRIP. Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the RPR**.** The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 401-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons (227 metric tons) or 1/2 sublot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 401-4.14 using the same

procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip will be considered acceptable by the RPR if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 401-5.5a; and Mat density, air voids, and joint density meet the requirements specified in paragraphs 401-6.2.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

Payment will only be made for an acceptable control strip in accordance with paragraph 401-8.1 using a lot pay factor equal to 100.

CONSTRUCTION METHODS

401-4.1 WEATHER LIMITATIONS. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40 [1]	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

401-4.2 ASPHALT PLANT. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

a. Inspection of plant. The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

b. Storage bins and surge bins. The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

401-4.3 AGGREGATE STOCKPILE MANAGEMENT. Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

401-4.4 HAULING EQUIPMENT. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4.1 MATERIAL TRANSFER VEHICLE (MTV). Material transfer vehicles used to transfer the material from the hauling equipment to the paver, shall use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation.

401-4.5 ASPHALT PAVERS. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

401-4.6 ROLLERS. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

401-4.7 DENSITY DEVICE. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.8 PREPARATION OF ASPHALT BINDER. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

401-4.9 PREPARATION OF MINERAL AGGREGATE. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is

added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.10 PREPARATION OF ASPHALT MIXTURE. The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

401-4.11 APPLICATION OF PRIME AND TACK COAT. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

401-4.12 LAYDOWN PLAN, TRANSPORTING, PLACING, AND FINISHING. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 12 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet (3 m) from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m). On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The RPR may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the RPR, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet (3 m) long.

401-4.13 COMPACTION OF ASPHALT MIXTURE. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.
In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.14 JOINTS. The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C**)**; or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

401-4.15 SAW-CUT GROOVING. Saw-cut grooving is not required.

401-4.16 DIAMOND GRINDING. Diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces.Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

401-4.17 NIGHTTIME PAVING REQUIREMENTS. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

CONTRACTOR QUALITY CONTROL (CQC)

401-5.1 GENERAL. The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

401-5.2 CONTRACTOR QUALITY CONTROL (QC) FACILITIES. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-5.3 CONTRACTOR QC TESTING. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

a. Asphalt content. A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

b. Gradation. Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

c. Moisture content of aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

f. In-place density monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

g. Smoothness for Contractor Quality Control. The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot (3.7 m) "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using the FAA profile program, ProFAA or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To

avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR by the end of the following working day.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus ½ inch and replacing with new material. Skin patching is not allowed.

401-5.4 SAMPLING. When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-5.5 CONTROL CHARTS. The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

a. Individual measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 μm)	±3%	±4.5%
No. 200 (75 μm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts shall be established to control gradation process variability. The range shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of n = 2. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for n = 3 and by 1.27 for n = 4.

Control Chart Limits Based on Range

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 μm)	6%
No. 200 (75 μm)	3.5%
Asphalt Content	0.8%

c. Corrective Action. [The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

(1) One point falls outside the Suspension Limit line for individual measurements or range; or

(2) Two points in a row fall outside the Action Limit line for individual measurements.

401-5.6 QC REPORTS. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

MATERIAL ACCEPTANCE

401-6.1 ACCEPTANCE SAMPLING AND TESTING. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

a. Quality assurance (QA) testing laboratory. The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

b. Lot size. A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

c. Asphalt air voids. Plant-produced asphalt will be tested for air voids on a sublot basis.

(1) Sampling. Material from each sublot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 60 minutes nor more than 90 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each sublot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6926.

d. In-place asphalt mat and joint density. Each sublot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

(1) Sampling. The Contractor will cut minimum 5 inch (125 mm) diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the RPR.

(2) Bond. Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the RPR to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the RPR.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the RPR for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each sublot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or sublot shall be corrected by the Contractor at his expense by removing

the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the RPR to circumscribe the deficient area.

(4) Mat density. One core shall be taken from each sublot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each sublot sample by the TMD for that sublot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each sublot that has a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 ACCEPTANCE CRITERIA.

a. General. Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, grade.

b. Air Voids and Mat density. Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

c. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

d. Grade. The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

e. Profilograph roughness for QA Acceptance. Not used.

401-6.3 PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL). The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

Table 5. Acceptance Limits for Air Voids and Density

Test Property	Pavements Specification Tolerance Limits	
	L	**U**
Air Voids Total Mix (%)	2.0	5.0
Surface Course Mat Density (%)	92.8	-
Base Course Mat Density (%)	92.0	-
Joint density (%)	90.5	--

a. Outliers. All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

401-6.4 RESAMPLING PAVEMENT FOR MAT DENSITY.

a. General. Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

(1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%.

METHOD OF MEASUREMENT

401-7.1 MEASUREMENT. Asphalt shall be measured by the number of square yards of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage to determine tons placed per square yard.

BASIS OF PAYMENT

401-8.1 PAYMENT. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

a. The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of tons of asphalt used in the accepted work.

b. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

c. **Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the sublot shall be reduced by 5%.

Table 6. Price adjustment schedule[1]

Percentage of material within specification limits (PWL)	Lot pay factor (percent of contract unit price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject [2]

[1] Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.

[2] The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid

for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

d. Profilograph Roughness. Not used.

401-8.1 PAYMENT.

Payment will be made under:

Item P-401a	Asphalt Surface Course (3/4", 4" Thick) - per square yard
Item P-401b	Asphalt Surface Course (3/4", 3" Thick) - per square yard
Item P-401c	Asphalt Surface Course (3/4", 2" Thick) - 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.

ASTM INTERNATIONAL (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

ASPHALT INSTITUTE (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder
Asphalt Institute MS-2 Mix Design Manual, 7th Edition
AI State Binder Specification Database

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

Long Term Pavement Performance Binder Program

ADVISORY CIRCULARS (AC)

AC 150/5320-6	Airport Pavement Design and Evaluation

FAA ORDERS

5300.1	Modifications to Agency Airport Design, Construction, and Equipment Standards

SOFTWARE

FAARFIELD

****END OF ITEM P-401****

ITEM P-603 EMULSIFIED ASPHALT TACK COAT

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

603-2.1 ASPHALT MATERIALS. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

603-3.1 WEATHER LIMITATIONS. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

603-3.2 EQUIPMENT. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

603-3.3 Application of emulsified asphalt material. The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	.0.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

603-3.4 FREIGHT AND WAYBILLS. The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

METHOD OF MEASUREMENT

603-4.1 The emulsified asphalt material for tack coat shall be measured by the gallon. Volume shall be corrected to the volume at 60°F in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

BASIS OF PAYMENT

603.5-1 Payment shall be made at the contract unit price per gallon of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603a	Emulsified Asphalt Tack Coat - per gallon

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

****END ITEM P-603****

P-610 CONCRETE FOR MISCELLANEOUS STRUCTURES

DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

MATERIALS

610-2.1 GENERAL. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. **Reactivity.** Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix. If expansion of either the coarse or fine aggregate exceeds 0.08% at 14 days, limit the alkali of the concrete to be less than or equal to 3.0 lb per cubic yard (1.8 kg per cubic meter), calculated in accordance with EB 106.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 COARSE AGGREGATE. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
¾ inch (19 mm)	67
½ inch (12.5 mm)	7

610-2.2.1 COARSE AGGREGATE SUSCEPTIBILITY TO DURABILITY (D) CRACKING.

Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

Crushed granite, calcite cemented sandstone, quartzite, basalt, diabase, rhyolite or trap rock are considered to meet the D-cracking test requirements but must meet all other quality tests specified in Item P-501.

610-2.3 FINE AGGREGATE. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 CEMENT. Cement: ASTM C150, Types I, II, or V; ASTM C595, Types IS, IP, IL, or IT.

610-2.5 CEMENTITIOUS MATERIALS.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 WATER. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 ADMIXTURES. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit

complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. **Air-entraining admixtures**. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. **Water-reducing admixtures**. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. **Other chemical admixtures**. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 PREMOLDED JOINT MATERIAL. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751**.**

610-2.9 JOINT FILLER. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 STEEL REINFORCEMENT. Reinforcing shall consist of Reinforcing Steel conforming to the requirements of ASTM A615, ASTM A706, ASTM A775, ASTM A934.

610-2.11 MATERIALS FOR CURING CONCRETE. Curing materials shall conform to one of the following specifications.

Waterproof paper	ASTM C171
Clear or white Polyethylene Sheeting	ASTM C171
White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B	ASTM C309

CONSTRUCTION METHODS

610-3.1 GENERAL. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 CONCRETE MIXTURE. The concrete shall develop a compressive strength of 4000 psi 28 MPa in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

610-3.3 MIXING. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPRs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 FORMS. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 PLACING REINFORCEMENT. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 EMBEDDED ITEMS. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

610-3.7 CONCRETE CONSISTENCY. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 PLACING CONCRETE. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 VIBRATION. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 JOINTS. Joints shall be constructed as indicated on the plans.

610-3.11 FINISHING. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 CURING AND PROTECTION. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 COLD WEATHER PLACING. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 HOT WEATHER PLACING. When concrete is placed in hot weather greater than 85ºF (30 ºC), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

QUALITY ASSURANCE (QA)

610-4.1 QUALITY ASSURANCE SAMPLING AND TESTING. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 DEFECTIVE WORK. Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

METHOD OF MEASUREMENT

610-5.1 Concrete shall be considered incidental and no separate measurement shall be made.

BASIS OF PAYMENT

610-6.1 Concrete shall be considered incidental and no separate payment shall be made.

Payment will be made under:

No pay items

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete

ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

****END OF ITEM P-610****

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 1. MARKING MATERIALS

Paint[1]				Glass Beads[2]	
Type	**Color**	**Fed Std. 595 Number**	**Application Rate Maximum**	**Type**	**Application Rate Minimum**
Waterborne Type I or II	Yellow	33538 or 33655	115 ft2/gal (2.8 m2/l)	Type I Gradation A	7 lb/gal (0.85 kg/l)
Waterborne Type I or II	Black	37038	115 ft2/gal (2.8 m2/l)	Not Used	Not Used
Waterborne Type I or II	Pink	1 part 31136 to 2 parts 37925	115 ft2/gal (2.8 m2/l)	Type I Gradation A	7 lb/gal (0.85 kg/l)
Temporary Marking Waterborne Type I or II	All	See Above	230 ft2/gal (5.6 m2/l)	Not Used	Not Used

[1] **See paragraph 620-2.2a**

[2] **See paragraph 620-2.2b**

a. Paint. Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

1. Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II. 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 and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type III.

Glass beads for red and pink paint shall meet the requirements for Type I, Gradation A.

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.

Type III glass beads shall not be used in red and pink 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 contaminates 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.

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.

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.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

MARKING DIMENSIONS AND SPACING TOLERANCE

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

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 by the Contractor in the presence of the RPR, 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.

MINIMUM RETRO-REFLECTANCE VALUES

Material	**Retro-reflectance mcd/m²/lux**		
	White	**Yellow**	**Red**
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than[1]	100	75	10

[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 disfiguration 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.

METHOD OF MEASUREMENT

620-4.1a The quantity of surface preparation (obliterations) shall be measured by the number of square feet for each type of surface preparation specified in paragraph 620-3.3.

620-4.1b The quantity of markings for both permanent and temporary markings shall be measured by the number of square feet of painting**.**

620-4.1c The quantity of reflective media shall not be paid for directly, but will be incidental to the payment for markings.

BASIS OF PAYMENT

620-5.1 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 surface preparation (obliterations) shall be made at the contract price for the number of square feet for each type of surface preparation specified in paragraph 620-3.3.

620-5.3 Payment for markings for both permanent and temporary shall be made at the contract price for by the number of square feet of painting.

Payment will be made under:

Item P-620a	Surface Preparation (Obliterations) - per square foot
Item P-620b	Marking (Temporary) - per square foot
Item P-620c	Marking (Permanent) – per square foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200	Hazard Communication

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

Commercial Item Description

A-A-2886B	Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1	Standards for Airport Markings
AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-620

ITEM D-701 PIPE FOR STORM DRAINS AND CULVERTS

DESCRIPTION

701-1.1 This item shall consist of the construction of pipe culverts and storm drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

701-2.1 Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.

701-2.2 PIPE. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:

American Association of State Highway and Transportation Officials (AASHTO) M167	Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter
AASHTO R73	Standard Practice for Evaluation of Precast Concrete Drainage Productions
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1577	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
ASTM C1786	Standard Specification for Segmental Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
ASTM C1840	Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe

ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM F667	Standard Specification for 3 through 24 in Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings **]**

701-2.3 CONCRETE. Concrete for pipe cradles shall have a minimum compressive strength of 2000 psi (13.8 MPa) at 28 days and conform to the requirements of ASTM C94.

701-2.4 RUBBER GASKETS. Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.

701-2.5 JOINT MORTAR. Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

701-2.6 JOINT FILLERS. Poured filler for joints shall conform to the requirements of ASTM D6690.

701-2.7 PLASTIC GASKETS. Plastic gaskets shall conform to the requirements of ASTM C990

701-2.8. CONTROLLED LOW-STRENGTH MATERIAL (CLSM). Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used, all joints shall have gaskets.

701-2.9 PRECAST BOX CULVERTS. Manufactured in accordance with and conforming to ASTM C1433.

701-2.10 PRECAST CONCRETE PIPE. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or American Concrete Pipe Association QCast Plant Certification program.

CONSTRUCTION METHODS

701-3.1 EXCAVATION. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

701-3.2 BEDDING. The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

a. Rigid pipe. The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe.

b. Flexible pipe. For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

Flexible Pipe Bedding

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	**mm**	**inch**	**mm**
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

c. Other pipe materials. For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

701-3.3 LAYING PIPE. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 JOINING PIPE. Joints shall be made with (1) cement mortar, (2) cement grout, (3) rubber gaskets, (4) plastic gaskets, (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

a. Concrete pipe. Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even. Concrete pipe joints shall be sealed with rubber gaskets meeting ASTM C443 when leak resistant joints are required. Concrete pipe joints shall be sealed with butyl mastic meeting ASTM C990 or mortar when soil tight joints are required. Joints shall be thoroughly wetted before applying mortar or grout.

b. Metal pipe. Metal pipe shall be firmly joined by form-fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M196 for aluminum pipe.

c. PVC, Polyethylene, or Polypropylene pipe. Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 when leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M252 or ASTM M294. Fittings for polypropylene pipe shall conform to ASTM F2881, ASTM F2736, or ASTM F2764.

d. Fiberglass pipe. Joints and fittings shall be as detailed on the plans and in accordance with the manufacturers recommendations. Joints shall meet the requirements of ASTM D4161 for flexible elastomeric seals.

701-3.5 EMBEDMENT AND OVERFILL. Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

701-3.5-1 EMBEDMENT MATERIAL REQUIREMENTS

a. Concrete Pipe. Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

b. Plastic and fiberglass Pipe. Embedment material shall meet the requirements of ASTM D3282, A-1, A-2-4, A-2-5, or A-3. Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.

c. Metal Pipe. Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. Embedment material shall extend to 12 inches above the top of the pipe.

701-3.5-2 PLACEMENT OF EMBEDMENT MATERIAL

The embedment material shall be compacted in layers not exceeding 6 inches (150 mm) on each side of the pipe and shall be brought up one foot (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches (150 mm) and shall be brought up evenly on each side of the pipe to one foot (30 cm) above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

701-3.6 OVERFILL

Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be place and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D698. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

701-3.7 INSPECTION REQUIREMENTS

An initial post installation inspection shall be performed by the RPR no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

For pipe sizes larger than 48 inches, a walk-through visual inspection shall be performed.

Incorporate specific inspection requirements for the various types of pipes beneath the general inspection requirements.

Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm.

.Determine whether the allowable deflection has been exceeded by use of a laser profiler for internal pipe diameters of 48 inches or less, or direct measurement for internal pipe diameters greater than 48 inches. Laser profile equipment shall utilize low barrel distortion video equipment. Deflection of installed pipe shall not exceed the limits provided in the table below, as a percentage of the average inside diameter of the pipe.

MAXIMUM ALLOWABLE PIPE DEFLECTION

Type of Pipe	Maximum Allowable Deflection (%)
Corrugated Metal Pipe	5
Concrete Lined CMP	3
Thermoplastic Pipe	5
Fiberglass	5

If deflection readings in excess of the allowable deflection are obtained, remove the pipe with excessive deflection and replace with new pipe. Isolated areas may exceed allowable by 2.5% with concurrence of RPR. Repair or replace any pipe with cracks exhibiting displacement across the crack, bulges, creases, tears, spalls, or delaminations. The report for flexible pipe shall include as a minimum, the deflection results and final post installation inspection report. The inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design line and grade, and inspector's notes.

METHOD OF MEASUREMENT

701-4.1 The length of pipe shall be measured in linear feet (m) of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The identify each class, types and size of pipe shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

701-4.2. Not used.

701-4.3 Not used.

701-4.4 Not used.

BASIS OF PAYMENT

701-5.0 These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

701-5.1 Payment will be made at the contract unit price per linear foot for 23"x14" Class V RCP.

701-5.2 Not used.

701-5.3 Not used.

701-5.4 Not used.

Payment will be made under:

Item P-701a	23"x14" Class V RCP per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M167	Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M190	Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M219	Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M243	Standard Specification for Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter

ASTM International (ASTM)

ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A761	Standard Specification for Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
ASTM C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM D1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications

National Fire Protection Association (NFPA)

NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

END ITEM D-701

ITEM D-710 ROCK RIPRAP

DESCRIPTION

710-1.1 This item shall govern the furnishing and placing of rock riprap as shown on the plans and called for in these specifications. Placing of riprap will include all bedding, fabric and stones as indicated on the plans or directed by the Engineer.

MATERIAL

710-2.1 STONE. All stone for rock riprap shall be sound, durable, and free from seams, cracks, and other defects and shall be as nearly rectangular as practicable. The stone shall have a specific gravity of at least 2.25.

CLASSIFICATION AND GRADATION OF RIPRAP

Riprap shall conform to the gradation requirements given in Table 1.

TABLE 1: GRADATION OF RIPRAP

Stone Size d50[1] (inches)	% of Material Smaller Than Typical Stone[2]	Typical Stone Dimensions[3] (inches)	Typical Stone Weight[4] (pounds)
6	70-100	12	85
	50-70	9	35
	35-50	6	10
	2-10	2	0.4
9	70-100	15	160
	50-70	12	85
	35-50	9	35
	2-10	3	1.3
12	70-100	21	440
	50-70	18	275
	35-50	12	85
	2-10	4	3
18	100	30	1280
	50-70	24	650
	35-50	18	275
	2-10	6	10
24	100	42	3500
	50-70	33	1700
	35-50	24	650
	2-10	9	35

[1]d50 = nominal stone size
[2]based on typical rock mass
[3]equivalent spherical diameter
[4]based on a specific gravity = 2.5

Broken concrete pieces may be used in lieu of natural rock provided the dimensional requirements above are met, the pieces are sound and durable, and the material is approved by the Engineer prior to placing.

Nominal stone size of the riprap shall be as shown on the plans. The nominal thickness of the completed riprap section regardless of the type specified shall be 1.5 times the mean diameter of the rock specified in Table 1 of this specification.

710-2.2 BEDDING MATERIAL. The free draining material shall consist of a Colorado Highway Specification; Class B or Class C filter material.

710-2.3 FILTER FABRIC. The filter fabric material to be placed under the rock riprap shall be a non-woven polypropylene fabric such as Phillips Supac 8 or approved equal, having the following properties:

a.	Weight	8 ounces/square yard
b.	Tensile strength, wet	Warp direction - 200 pounds Fill direction - 275 pounds
c.	Mullen Burst (ASTM D 751)	400 psi
d.	Elongation-at-break	75 percent

710-2.4 CEMENT GROUT. Grout shall be composed of one part by volume of portland cement and three parts by volume of sand and shall be of such consistency that it will fill voids in the riprap.

The mixed concrete shall contain 470 pounds (five sacks) of portland cement per cubic yard.

The amount of water added at the time of mixing shall be such as will produce a mixture with a slump of from three inches to five inches when tested in accordance with the method described in Item P-610 of these specifications. (If the Contractor chooses to place the grout at a higher slump (pumping), he must maintain the same water cement ratio).

EXCAVATION

710-3.1 The slopes shall be finished to a reasonably smooth and compact surface within 2 inches of the lines, surfaces, and elevations shown on the plans.

CONSTRUCTION METHODS

710-4.1 ROCK RIPRAP. The filter fabric shall be spread on the prepared subgrade to provide a continuous, smooth surface. After placing bedding material, the stone shall be spread on the filter fabric so as to produce a compact, well graded mass of minimum voids. Spreading shall be done so as to cause as little disturbance to the filter fabric as possible. Some rearranging of individual pieces may be required, either by hand or equipment, to obtain a reasonably uniform surface.

710-4.2 GROUTED RIPRAP. When grouted riprap is specified, the stone shall be laid as set forth above for rock riprap. The spaces between the stones shall then be filled with grout. Sufficient grout shall be used to completely fill all voids, except that the face surface of the stone shall be left exposed. After grouting is completed, the surface shall be cured for a period of at least three days.

METHOD OF MEASUREMENT

710-5.1 Rock riprap shall be measured by the square yard, to the dimensions of the riprap as shown on the plans or as directed by the Engineer. Excavation, sand bed, and the filter fabric are included in the contract unit price for rock riprap and no separate measurement nor payment will be made for them.

BASIS OF PAYMENT

710-6.1 The accepted quantity of rock riprap will be paid for at the contract unit price per square yard. This price shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:
Item D-710a Rip Rap (D50=6", T=2') Underlain w/ Filter Fabric– per cubic yard

TESTING AND MATERIAL REQUIREMENTS

Test and Short Title	Material and Short Title
ASTM D 751	Coated Fabric

****END OF ITEM D-710****

Item D-751 Manholes, Catch Basins, Inlets and Inspection Holes

DESCRIPTION

751-1.1 This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

MATERIALS

751-2.1 BRICK. The brick shall conform to the requirements of ASTM C32, Grade MS.

751-2.2 MORTAR. Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

751-2.3 CONCRETE. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 PRECAST CONCRETE PIPE MANHOLE RINGS. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

751-2.5 CORRUGATED METAL. Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

751-2.6 FRAMES, COVERS, AND GRATES. The castings shall conform to one of the following requirements:

- **a.** ASTM A48, Class 35B: Gray iron castings
- **b.** ASTM A47: Malleable iron castings
- **c.** ASTM A27: Steel castings
- **d.** ASTM A283, Grade D: Structural steel for grates and frames
- **e.** ASTM A536, Grade 65-45-12: Ductile iron castings
- **f.** ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 STEPS. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

751-2.8 PRECAST INLET STRUCTURES. Manufactured in accordance with and conforming to ASTM C913.

CONSTRUCTION METHODS

751-3.1 UNCLASSIFED EXCAVATION.

a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.

e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

751-3.2 BRICK STRUCTURES.

a. **Foundations.** A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed in accordance with the requirements of Item P-610.

b. **Laying brick.** All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted. An ample layer of mortar shall be spread on the beds and a shallow furrow shall be made in it that can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar

at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and re-laid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.

c. Joints. All joints shall be filled with mortar at every course Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch (9 mm) thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch (6 mm) nor more than 1/2 inch (12 mm) wide and the selected joint width shall be maintained uniform throughout the work.

d. Pointing. Face joints shall be neatly struck, using the weather-struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used, the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.

e. Cleaning. Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.

f. Curing and cold weather protection. The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50°F (10°C) unless the Contractor has, on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60°F (16°C) for the duration of the curing period.

751-3.3 CONCRETE STRUCTURES. Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

751-3.4 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated

steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

751-3.5 CORRUGATED METAL STRUCTURES. Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

751-3.6 INLET AND OUTLET PIPES. Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

751-3.7 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES, AND FITTINGS. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

751-3.8 INSTALLATION OF STEPS. The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

751-3.9 BACKFILLING.

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

751-3.10 CLEANING AND RESTORATION OF SITE. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

METHOD OF MEASUREMENT

751-4.1 Manholes, catch basins, inlets, and inspection holes shall be measured by the unit.

BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item D-751a	Inlet Structure with Grate - per each
Item D-751n	Outlet Structure with Grate - 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)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains

****END OF ITEM D-751****

Item T-901 SEEDING

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding fertilizing, and hydromulching the areas shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

901-2.1 SEED. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Seed Botanical Name (Common Name)	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb/acre (or lb/1,000 S.F.)
Aristida purpurea (Purple three awn	95	80	3.0
Bouteloua aristidoides (Needle grama)	95	80	2.0
Bouteloua barbata (Six weeks grama)	95	80	1.0
Bouteloua rothrockii (Rothrocks grama)	95	80	1.0
Plantago insularis (Indian wheat)	95	80	5.0
Senna couesii (Desert senna)	95	80	2.0
Sphaeralcea ambigua (Desert globemallow)	95	80	1.0
Sporobolus cryptandrus (Sand dropseed)	95	80	1.0
Baileya multiradiata (Desert marigold)	95	80	1.0

Seeding shall be performed during the period between October and April inclusive, unless otherwise approved by the RPR.

901-2.2 LIME. Not required.

901-2.3 FERTILIZER. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be composed of a mixture of one part sulfur-coated urea 25-4-8, one part monammonium phosphate 11-52-0, and one part methylene urea 38-0-0. The sulfer coated urea, a blended fertilizer 25-4-8, shall have 80 percent of the nitrogen defined as slow release, and contain 5 percent Iron, 10 percent sulfur and trace amounts of zinc and manganese. The resulting 24-18-2 chemical blended fertilizer mixture, as specified herein, shall be applied at the rate of 200 pounds per acre. In addition to the fertilizer mixture, agricultural sulfur compounds, comprised of between 80 percent and 96 percent sulfur, shall be applied at the rate of 200 pounds per acre.

901-2.4 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

901-2.5 HYDROMULCH. The material for hydromulch shall be a virgin wood cellulose fiber that is thermally produced, air dried and conforming to the following:

Percent Moisture Content	10 + 3 percent
Percent Organic Matter	99.3% + .2%
Percent Ash Content	0.7 + 0.2 percent
pH Range	4.9 + 0.5
Percent Water Holding Capacity	1200-1600 grams H2O per 100 grams fiber
Water Soluble Dye	Green

901-2.6 TACKIFIER. Inorganic tackifier and asphaltic materials will not be permitted. The organic tackifier shall be a free-flowing, noncorrosive powder produced from natural plant gum of Plantago Insulares (Desert Indian Wheat) applied as recommended by the manufacturer.

901-2.7 SUBMITTALS. Material submittals are required on seed, mulch, and tackifier. No material shall be ordered until the Engineer has received and approved the material submittals.

CONSTRUCTION METHODS

901-3.1 ADVANCE PREPARATION AND CLEANUP. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or

other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade. When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 DRY APPLICATION METHOD.

a. Liming. Not required.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

901-3.3 WET APPLICATION METHOD.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on

surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 MAINTENANCE OF SEEDED AREAS. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units acre measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item T-901a	Seeding with (Hydromulch) - per acre

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials

Federal Specifications (FED SPEC)

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural

Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

****END OF ITEM T-901****

ITEM T-905 TOPSOIL

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

905-2.1 TOPSOIL. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75 μm) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 INSPECTION AND TESTS. Within 10 days following acceptance of the bid, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in paragraph 905-2.1.

CONSTRUCTION METHODS

905-3.1 GENERAL. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

905-3.2 PREPARING THE GROUND SURFACE. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the RPR, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

905-3.3 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 PLACING TOPSOIL. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. after spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

METHOD OF MEASUREMENT

905-4.1 TOPSOIL SHALL BE CONSIDERED INCIDENTAL AND NO SEPARATE MEASUREMENT SHALL BE MADE.BASIS OF PAYMENT

905-5.1 Topsoil shall be considered incidental and no separate payment shall be made

Payment will be made under:

No pay items.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing

Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-905

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ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 GENERAL.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item 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. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. 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 electronically submitted in pdf format. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers

connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, Maintenance Airport Visual Aid Facilities, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 CABLE. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type B, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 BARE COPPER WIRE (COUNTERPOISE, BARE COPPER WIRE GROUND AND GROUND RODS). Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper-clad steele. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 10 feet (2.54 m) long and 3/4 inch (19 mm) in diameter.

108-2.4 CABLE CONNECTIONS. In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

a. The cast splice. A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The taped or heat-shrink splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

108-2.5 SPLICER QUALIFICATIONS. Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

108-2.7 FLOWABLE BACKFILL. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

108-2.8 CABLE IDENTIFICATION TAGS. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 TAPE. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 ELECTRICAL COATING. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 EXISTING CIRCUITS. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 DETECTABLE WARNING TAPE. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

108-3.1 GENERAL. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 INSTALLATION IN DUCT BANKS OR CONDUITS. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of

cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 INSTALLATION OF DIRECT-BURIED CABLE IN TRENCHES. Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly 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 end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

a. Trenching. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. 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 (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.

- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) 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 (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

b. Backfilling. After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables ; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8

inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153.

Trenches 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 turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the seeding as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153. Restoration shall be considered incidental to the pay item of which it is a component part.

108-3.4 CABLE MARKERS FOR DIRECT-BURIED CABLE. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

108-3.5 SPLICING. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

d. Taped or heat-shrink splices. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminates prior to application.

e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 BARE COUNTERPOISE WIRE INSTALLATION FOR LIGHTNING PROTECTION AND GROUNDING. If shown on the plans or included in the job specifications, bare solid **[** #6 AWG **]** copper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. – The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.

b. Isolation – Counterpoise size is as shown on the plans. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define "adjacent to".

The counterpoise conductor shall be installed halfway between the pavement edge and the light base, mounting stake, raceway, or cable being protected.

The counterpoise conductor shall be installed 8 inches (203 mm) minimum below grade. The counterpoise is not connected to the light base or mounting stake. An additional grounding electrode is required at each light base or mounting stake. The grounding electrode is bonded to the light base or mounting stake with a 6 AWG solid copper conductor.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Isolation Method of lightning protection.

c. Common Installation requirements. When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

d. Parallel Voltage Systems. Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

108-3.7 COUNTERPOISE INSTALLATION ABOVE MULTIPLE CONDUITS AND DUCT BANKS. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of

counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

108-3.8 COUNTERPOISE INSTALLATION AT EXISTING DUCT BANKS. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.9 EXOTHERMIC BONDING. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

a. All slag shall be removed from welds.

b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.

c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3MTM ScotchkoteTM, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 TESTING. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

a. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

b. That all affected circuits (existing and new) are free from unspecified grounds.

c. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 50 megohms. Verify continuity of all series airfield lighting circuits prior to energization.

d. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

e. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

f. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

g. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work.

108-4.2 Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) installed and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall not include additional quantities required for slack.

108-4.3 No separate payment will be made for ground rods.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108a	Install #8 AWG L-824C, 5000V Wire – per linear foot
Item L-108b	Install #6 AWG, Bare Copper Counterpoise Including Ground Rods and Terminations – per linear foot
Item L-108c	Install #10 AWG XHHW, 600V Wire – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical

MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

****END OF ITEM L-108****

ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits and removal of existing duct banks. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR

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b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per 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, that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item 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. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify 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 made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue 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 electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

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. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 STEEL CONDUIT. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth."

110-2.3 PLASTIC CONDUIT. Plastic conduit and fittings-shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II–Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 SPLIT CONDUIT. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 CONDUIT SPACERS. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 FLOWABLE BACKFILL. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 DETECTABLE WARNING TAPE. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under

paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank 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 (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.
Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables) cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 DUCT BANKS. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 CONDUITS WITHOUT CONCRETE ENCASEMENT. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.
Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and lot less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

110-3.4 MARKERS. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches

(100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 BACKFILLING FOR CONDUITS. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where 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 per instructions issued by the RPR.

110-3.6 BACKFILLING FOR DUCT BANKS. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where 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 per instructions issued by the RPR.

110-3.7 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include seeding shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 OWNERSHIP OF REMOVED CABLE. The Contractor shall remove all abandoned/unused conductors contained in conduits in which new conductors will be installed. No abandoned conductors shall be left in place at the completion of the job. All removed wire shall become the property of the Contractor and the Contractor shall be held responsible for removing the wire off airport property. The removal of existing conductors shall be considered incidental to the respective duct pay item and no separate payment will be made.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, 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 per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110a	Install 1-2" SCH 40 PVC Conduit (DEB) – per linear foot
Item L-110b	Install 1-2" SCH 40 PVC Conduit (CE) – per linear foot
Item L-110c	Install 2-2" SCH 40 PVC Conduit (DEB) – per linear foot
Item L-110d	Install 2-2" SCH 40 PVC Conduit (CE) – per linear foot
Item L-110e	Install 4-2" SCH 40 PVC Conduit (CE) – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel

UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

****END OF ITEM L-110****

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ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

EQUIPMENT AND MATERIALS

115-2.1 GENERAL.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

c. All materials and equipment used to construct this item 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. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue 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 electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

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 the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 CONCRETE STRUCTURES. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 PRECAST CONCRETE STRUCTURES. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.
Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 100,000 lb aircraft loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

115-2.4 JUNCTION BOXES. Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

115-2.5 MORTAR. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 CONCRETE. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

115-2.7 FRAMES AND COVERS. The frames shall conform to one of the following requirements:

a.	ASTM A48	Gray iron castings
b.	ASTM A47	Malleable iron castings
c.	ASTM A27	Steel castings
d.	ASTM A283, Grade D	Structural steel for grates and frames
e.	ASTM A536	Ductile iron castings
f.	ASTM A897	Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of 250 psi and maximum load of 100,000 lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.
All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 LADDERS. Ladders, if specified, shall be galvanized steel or as shown on the plans.

115-2.9 REINFORCING STEEL. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 BEDDING/SPECIAL BACKFILL. Bedding or special backfill shall be as shown on the plans.

115-2.11 FLOWABLE BACKFILL. Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

115-2.12 CABLE TRAYS. Cable trays shall be of galvanized steel. Cable trays shall be located as shown on the plans.

115-2.13 PLASTIC CONDUIT. Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 CONDUIT TERMINATORS. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 PULLING-IN IRONS. Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

115-2.16 GROUND RODS. Ground rods shall be one piece, copper clad steel**.** The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

CONSTRUCTION METHODS

115-3.1 UNCLASSIFIED EXCAVATION. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.
Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.2 CONCRETE STRUCTURES. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 PRECAST UNIT INSTALLATIONS. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be

reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 INSTALLATION OF LADDERS. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

115-3.6 REMOVAL OF SHEETING AND BRACING. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 BACKFILLING. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 CONNECTION OF DUCT BANKS. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 GROUNDING. A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall

be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtails shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

115-3.10 CLEANUP AND REPAIR. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 RESTORATION. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 INSPECTION. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 MANHOLE ELEVATION ADJUSTMENTS. The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 DUCT EXTENSION TO EXISTING DUCTS. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

115-4.1 Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering:; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

115-4.2 Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115a	Remove Junction Box, Complete, per each
Item L-115b	Install L-867E Junction Box, Complete, 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.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Advisory Circular (AC)

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 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement

ASTM C206	Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83	In Pavement Light Fixture Bolts

Mil Spec

MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

****END OF ITEM L-115****

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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.

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 performs 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. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

EQUIPMENT AND MATERIALS

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

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
L-861T	2	1	NA	4	L-867	Blue	L-830 Size per Manufacturer	LED
L-861	2	1	NA	4	L-867	White	L-830 Size per Manufacturer	LED

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

Signs

Type	Size	Style	Class	Mode	Notes
L-858L/Y	1	2	2	2	LED
L-858R	1	2	2	2	LED

125-2.9 RUNWAY END IDENTIFIER LIGHT (REIL). Not required.

125-2.10 PRECISION APPROACH PATH INDICATOR (PAPI). Not required.

125-2.11 CIRCUIT SELECTOR CABINET. The circuit selector cabinet shall meet the requirements of AC 150/5345-5, Type L-847, four circuit control as indicated, Class A, indoor, Rating 1, for 6.6 amperes.

125-2.12 LIGHT BASE AND TRANSFORMER HOUSINGS. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases 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.

125-2.13 ISOLATION TRANSFORMERS. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

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.

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.

METHOD OF MEASUREMENT

125-4.1 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. Runway End Identifier Lights shall be measured by each system installed as a completed unit in place, ready for operation, and accepted by the RPR.

Precision Approach Path Indicator shall be measured by each system installed as a completed unit, in place, ready for operation, and accepted by the RPR. Abbreviated Precision Approach Path Indicator shall be measured by each system installed as a completed unit, 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 complete runway or taxiway light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator 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:

Item L-125a	Remove Base Mounted Runway/Taxiway Light, Complete – per each
Item L-125b	Remove L-858 Guidance Sign, Complete – per each
Item L-125c	Install L-861T LED Taxiway Edge Light, Complete – per each
Item L-125d	Install L-861 LED Runway Edge Light, Complete – per each
Item L-125e	Install L-858 LED Guidance Sign, Size 1, 2 Module, Complete – per each
Item L-125f	Install L-858 LED Guidance Sign, Size 1, 3 Module, Complete – per each
Item L-125g	Install L-858 LED Guidance Sign, Size 1, 4 Module, Complete – per each
Item L-125h	Install L-804 LED Runway Guard Light, Complete – per each
Item L-125i	Install L-853 Retroreflective Marker, Surface Mounted, Complete – per each
Item L-125j	Install L-890 ALCMS, Complete – per each
Item L-125k	Install L-858 LED Guidance Sign, Size 1, 1 Module, Complete – 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.

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****

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GENERAL TECHNICAL PROVISIONS

PROJECT NAME: MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

Schedule I
Realignment of Taxiways D7 and D8

Schedule II
Midfield Crossover Taxiway East

Schedule III
Install Airfield Lighting Control and Monitoring System (ALCMS)

AIP Project No. 3-04-0023-035-2023
City of Mesa Design Project No. CP0994East

Falcon Field Airport
Mesa, Arizona

mesa·az
FALCON FIELD AIRPORT

Sponsored By:

Federal Aviation Administration
Arizona Department of Transportation
City of Mesa

Issued for Bid
March 3, 2023

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GENERAL TECHNICAL PROVISIONS
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ITEM 10 GENERAL SPECIFICATIONS

10.01 UTILITIES AND EXISTING FACILITIES

This item shall govern the field location of all underground existing utilities in areas to be improved, to avoid conflicts with proposed surface or underground improvement. Work under this section shall include, but not be limited to, the location of all underground facilities. Underground facilities means any item that is buried or placed below ground for use in connection with the storage or conveyance of water, sewage, electronic, telephone or telegraphic communications, electric energy, oil, gas or other substances, and shall include, but not be limited to pipes, sewers, conduits, cables, valves, lines, wires, manholes, attachments and those portions of poles and their attachments below ground, including electrical and communication ducts, airfield lighting and control cables, fiber optic lines, storm drains, electrical and telephone lines. The Contractor shall employ a private utility location service to locate the existing Owner and non-Owner utilities prior to starting the work. The Contractor shall pothole and use prudent care when excavating and locating said utilities.

The Contractor shall, after October 1, 1988, comply with the State requirements regarding excavation and underground utilities per A.R.S., Chapter 2, Article 6.3. and other pertinent Sections of the Blue Stake Law. The Airport is not a member, but has distribution systems for gas, electrical, water, and sewer on the site. The Contractor shall be responsible for locating all Owner and non-Owner utilities.

The Contractor's attention is directed to the following Arizona Revised Statutes:

a. **ARS 40-360.22.** Excavations, determining location of underground facilities; providing information. This statute requires that no person shall begin excavation before the location and marking are complete or the excavator is notified that marking is unnecessary and requires that upon notification, the Owner of the facility shall respond as promptly as practical, but in no event later than two (2) working days. This section is not applicable to an excavation made during an emergency that involves danger to life, health or property if reasonable precautions are taken to protect underground facilities.

b. **ARS 40-360.23.** Making excavations in careful, prudent manner; liability for negligence. This statute states that obtaining information as required does not excuse any person making any excavation from doing so in a careful and prudent manner nor shall it excuse such persons from liability for any damage or injury resulting from his negligence.

c. **ARS 40-360.28.** Civil penalty; liability. If the Owner or operator fails to locate, or incorrectly locates the underground facility, pursuant to this article, the Owner or operator becomes liable for resulting damages, costs and expenses to the injured party.

10.01.01 EXISTING UTILITIES

The Contractor is hereby advised that the location of all utilities, as shown on the Plans, may not be complete nor exact and the Contractor shall satisfy himself/herself as to the exact location of the utilities. The Contractor shall be responsible for any damage done to public or private property and shall be repaired at the Contractor's expense.

Location of any underground telephone lines may be field verified by calling the Blue Stake Center telephone number 263-1100 or 1-800-STAKE-IT (Outside Maricopa County). The Contractor is required by Blue Stake Center to call at least two (2) working days before digging. The Contractor shall locate all utilities that Blue Stake will not locate.

The following utility companies may serve the Falcon Field Airport directly or can provide services as requested.

Table – Utility Companies for Existing Utilities and Flood Plain Information

Utility	Description
Water	City of Mesa
Electrical	Salt River Project
Airport	The City of Mesa (Communications & Special Systems)
Telephone	Century Link (emergency repair service phone number is 800.954.1211)
Sanitary	City of Mesa
Drainage	Maricopa Flood Control District, City of Mesa
Flood Plain	The project is within the 500-year flood plain

The Contractor is to protect all existing facilities during construction The Contractor shall notify the appropriate Utility Company or agency of any construction that may affect their facilities.

Measurement for "Location of Underground Utilities" shall be by the actual cost of the work. Cost for work for subcontractors (i.e., Utility Designation/Potholing contractor) will be based upon invoiced cost from the subcontractor. Cost shall be calculated in accordance with the MAG Uniform Specifications, Section 109. Underground Utility Location costs will be subject to daily monitoring and approval by the City of Mesa.

Payment for location of underground utilities, measured as prescribed above, shall be paid based on approved actual costs. Such payment shall be full compensation for furnishing all labor, equipment tools and materials and for all designation, preparation, excavation, backfilling and placing of materials; and for all incidentals necessary. Payment for the cost of each utility location will not be made until satisfactory survey data has been submitted to the City of Mesa.

Payment shall be made under:

Item GTP-10a Existing Utility Locates– per Lump Sum

10.01.02 WATER FOR CONSTRUCTION PURPOSES

The Contractor at their expense shall provide all water required for and in connection with the work to be performed. The Contractor shall remove all temporary waterlines installed by him/her, after completion of the work, if directed to do so by the City of Mesa.

It is the Contractor's responsibility to identify the water source, its compatibility, and storage for this project. The Contractor must submit a water source and its intended use to the City of Mesa for approval. Construction water will be at the expense of the Contractor.

10.01.03 ELECTRICAL POWER

All power for lighting, operation of Contractor's plant or equipment, or for any other use as may be required in the execution of the work to be performed under the provision of these Contract Documents shall be provided by the Contractor at their expense. The Contractor shall remove all temporary electrical facilities installed by him/her, after completion of the work, if ordered to do so by the City of Mesa.

10.01.04 TELEPHONE SERVICE

The Contractor shall make all necessary arrangements with the telephone utility for telephones in his/her offices at the site and separate telephones, fax, high-speed internet, and a direct service line in the office of the City of Mesa, and shall pay all monthly charges therefore including long distance calls from the office of the City of Mesa. All contractors and others performing work or furnishing services at the site shall be permitted to use the Contractor's telephone without charge for calls pertaining to the work.

10.01.05 SANITARY FACILITIES

Contractor shall furnish temporary sanitary facilities at the site, as provided herein, at their own expense, for the needs of all construction workers and others performing work or furnishing services on the project. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 20 workers. Contractor shall enforce the use of such sanitary facilities by all personnel at the site.

****END OF ITEM GTP-10****

ITEM 20 AIRFIELD BARRICADING, SAFETY, AND SECURITY

20.01 DESCRIPTION AND SCOPE

This item shall consist of furnishing and implementing an Airfield Traffic Control and Barricade Plan for the Midfield Crossover Taxiway East and Relocation of Taxiways D7 and D8 project. The Contractor is required to provide a plan that will ensure a safe and controlled traffic environment (construction and aircraft alike) during construction in accordance with the Phasing Plans provided in the contract drawings. The Contractor shall be responsible for submitting his own Phasing and Barricading Plans in which the limits of construction operations are outlined in a manner consistent with his Construction Schedule, for the approval of the City/Airport.

The Barricade and Traffic Control Plans must be submitted by the Contractor at the Pre-Construction Conference.

The Contractor shall submit a Cleanup Plan for approval by the Owner to be followed at the close of each day's work. At a minimum, the Plan shall include an itemized, detailed list of tasks and equipment to be used to properly clear all Aircraft Parking Ramp areas. The Plan shall specifically identify all work to be performed on a daily basis for each Phase of construction identified on the plans. The Plan shall also include the requirement of the Contractor and City of Mesa to perform a site walk of the entire effected area of construction a minimum of 2-hours before that area is scheduled to be re-opened to aircraft traffic to assure that it has be cleaned and cleared of all equipment and Foreign Object Debris (FOD).

The Contractor shall be responsible for providing, the installation of, and the maintenance of barricades, lights, and traffic control devices necessary for the control of aircraft, vehicular, and pedestrian traffic, (24-hours a day). Any requests to modify the approved barricading and phasing plans must be submitted to the City of Mesa for review and approval.

20.02 BARRICADE REQUIREMENTS

All construction areas shall be delineated with low-profile barricades that meet FAA standards to prevent intrusion by taxiing aircraft, vehicles, or pedestrians, (FAA AC 150/5370-2, latest edition). Low-profile barricades shall be orange in color with white reflective tape on both sides of the barricade and shall be a minimum of six (6) feet in length and a maximum of ten (10) inches in height, (not including required flagging or lights).

All barricades must be equipped with RED omni-directional lights, either flashing or steady burning, to provide additional visual warning whether during normal daytime and night-time operations or during periods of reduced visibility due to weather conditions. Lights may be either battery-powered or solar powered, however, the intensity of the lights must be sufficient to adequately and without ambiguity delineate the construction areas. The Contractor is responsible to maintain all barricade lights in working condition to the approval of the City of Mesa 24 hours a day.

Barricades should include orange or alternating orange and white checkered flags at least 20 inches by 20 inches square and securely fastened to prevent jet engine ingestion. The barricades shall be installed so that they are always in the extended position and properly oriented. Maximum spacing between barricades shall adhere to the approved plans, or as directed by the City of Mesa.

20.03 SIGNAGE REQUIREMENTS

The Contractor shall use temporary directional or way-finding signage for all access and haul routes, open trenching or other hazards. The temporary signage shall be clear, concise, reflective, and large enough so as to

minimize safety-related issues. All temporary signage shall be placed and maintained in a manner to withstand the particular elements it could experience, (i.e. monsoon winds, jet blast, etc.). All temporary signing shall meet the requirements of the most current version of the MUTCD, and shall be frangible.

20.04 SAFETY PLAN COMPLIANCE

The Contractor shall be responsible to provide a Construction Safety and Phasing Plan compliance document at the Preconstruction Conference. The Safety Plan Compliance Document (SPCD) details how the Contractor will comply with the CSPP (Appendix A). Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications. The effort required to prepare and submit a SPCD acceptable to airport operations shall be considered incidental to the Airfield Safety and Security line item provided in the bid, (GTP-20a).

20.05 METHOD OF MEASUREMENT AND PAYMENT

Measurement and payment for Airfield Traffic Control and Barricading for the Midfield Crossover Taxiway East and Relocation of Taxiways D7 and D8 project shall be made at the contract lump sum price, and shall be considered full compensation for furnishing all labor, materials, barricades, lights, flags, crossing guards, escorts, directional or way-finding signage, power vacuum sweepers; furnishing, placing, repositioning, and removal of temporary airside traffic control devices; application and removal of temporary pavement marking paint, all vehicle and equipment markings, security badges and training for all construction personnel (if required by FFZ or COM), tools, equipment, flagmen, cell phones, radios, and incidentals required to safely control traffic as identified in the Phasing Plans to provide the proper security for Falcon Field Airport. Partial payments of the lump sum item(s) will be made uniformly over the contract time, provided that the airside traffic control and security is maintained and satisfactory to the City Inspector and Airport Project Supervisor.

Payment will be made under:

Item GTP-20a Airfield Traffic Control and Barricades – per Lump Sum

****END SECTION 20****

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CONSTRUCTION SAFETY AND PHASING PLAN

PROJECT NAME: MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

Schedule I
Realignment of Taxiways D7 and D8

Schedule II
Midfield Crossover Taxiway East

Schedule III
Install Airfield Lighting Control and Monitoring System (ALCMS)

AIP Project No. 3-04-0023-035-2023
City of Mesa Design Project No. CP0994East

Falcon Field Airport
Mesa, Arizona

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FALCON FIELD AIRPORT



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Federal Aviation Administration
Arizona Department of Transportation
City of Mesa

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1. COORDINATION

During construction, airport operational safety is of paramount importance. Coordination of project information to all individuals involved with the project is essential for ensuring safe operations are maintained at all times. In order to minimize potential for incidents during construction, it is imperative that all individuals involved with the project and/or airport users be kept informed of any and all changes to operations. Discussions of operational safety will need to take place throughout the entire life of the project, including design, bidding, pre-construction, and construction. Meetings between the City Engineer/City Inspector, City of Mesa Falcon Field (Airport), Contractor, sub-contractors, airport tenants and airport users will be required to discuss specific project related impacts to operations. The Airport staff is ultimately responsible for the safety at the airport. Notice to users of operational changes due to construction will be issued via NOTAM's by the airport. No closures will be permitted without the pertinent NOTAM in place for each specific closure. Emergency access for both airport (ARFF) and off-airport (Police, Fire, and EMT) based emergency service shall be maintained at all times. Routing for such traffic shall be determined and made known to all supervisor personnel involved in the construction project. Coordination of this access will be proposed by the Contractor and approved by the City Engineer/City Inspector and the Airport Operations Supervisor/Forman.

A pre-construction meeting will be held after the project has been awarded and prior to the Contractor beginning work or staging major construction material and equipment on-site. The Airport, the Contractor's on-site supervisory staff, and the City Engineer/City Inspector shall be present. Safety and this document will be a significant topic on the agenda. Operational safety during construction will be a main topic of discussion at the pre-construction meeting.

A. CONTRACTOR PROGRESS MEETINGS

The Contractor is required to have weekly construction progress meetings to discuss all relevant construction topics including safety reminders, scheduling, and general construction issues. Attendance of the Contractor, City Engineer/City Inspector, Airport, and any other pertinent personnel are required at these meetings. Operational safety will be a standing agenda item for discussion during these progress meetings. A review of the Contractor's adherence to the project's Construction Safety and Phasing Plan (CSPP) and Safety Plan Compliance Document (SPCD) will be made at each meeting. Immediate correction of any deficiencies or violations will be required. The location and time of the weekly meetings will be determined during the pre-construction meeting. Where operational safety is concerned, the Contractor shall update the City Engineer/City Inspector overseeing construction on daily basis or more frequently if needed, of any changes or Contractor concerns.

B. SCOPE OR SCHEDULE CHANGES

In the event of a scope or schedule change, the Contractor shall notify the City Engineer/City Inspector and the Airport Operations Supervisor/Forman immediately. All parties involved will need to evaluate the impact(s) of the change and will determine what measures will need to be taken to maintain a safe construction site. Change in the scope or duration of the project may necessitate revisions to the Construction Safety and Phase Plan (CSPP).

C. FAA ATC COORDINATION

The FAA ATC will need to be notified immediately of any changes that affect aircraft movement within the airport which include airway facility shutdowns and restarts. The Airport will be responsible for coordinating any changes including NOTAM's to the FAA ATC. It is not anticipated that any shutdown to FAA facilities will be required for this project. All project limits are outside the critical area of any navigational aid (NAVAID).

2. PHASING

In order to minimize disruptions to airport operations during construction, construction will be broken up by areas to limit the amount of aircraft operational areas affected at any given time. The phasing plan proposed was developed with help from the Airport and is considered to be the most effective way of maintaining the required aircraft access, while imposing the least amount of impact on construction operations, and without sacrificing safety. The phasing for this project is presented below, and is visually depicted in the Construction Safety Drawings (Sheets G050 through G057) attached at the back of this document.

This project will be completed in two separate schedules with the project having a total of six phases. Each of the phases is discussed in further detail in the Construction Safety Drawing plan sheets included at the end of this document.

A. PHASE ELEMENTS

I. Schedules II and III, Phase 1 – Construct Midfield Crossover Taxiway East (Construction Safety Drawing G052)

During this phase, the Contractor will be clearing and grubbing the area between Runways 4L/22R and 4R/22L, preparing subgrade, constructing base course, and constructing the new asphalt pavement section for the portion of the midfield crossover taxiway outside the Runway Safety Areas for both runways. ALCMS work may also occur during this phase. Hauling activities will be required across the active Taxiways B and C. Aircraft will have the right of way at all times. Flaggers will be required for crossing Taxiways B and C. Work withing this phase will be completed at night between the hours of 6 pm and 6 am. Light plants will be required for this work.

During Phase 1, Runway 4L/22R will be closed from 6 pm to 6 am. Access for aircraft traffic to Runway 4R/22L will be unchanged.

ARFF access to the runways will be unaffected.

Phase 1 will be partially concurrent with Phase 2. Phase 2 will begin once the earthwork and base course for Phase 1 have been completed.

Phase 1 is anticipated to take 65 calendar days

II. Schedule II, Phase 2 – Construct Midfield Crossover Taxiway East (Construction Safety Drawing G053)

During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Runway 4L/22R, preparing subgrade, constructing base course, and constructing the new asphalt pavement section. Hauling activities will be required across the active Taxiways B and C. Aircraft will have the right of way at all times. Flaggers will be required for crossing Taxiways B and C. During this Phase Runway 4L/22R will be closed to aircraft operations. Prior to beginning work on this phase, the Contractor shall have barricades in place in accordance with the plans.

Access for aircraft traffic across the airfield will be via Taxiways A, B, and C. Runway 4L/22R will be closed for takeoff and landing operations but will be available for taxi operations outside the designated work areas.

ARFF access to the runways will be unaffected.

Phase 2 will be completed concurrently with Phase 1. Phase 2 will begin after the subgrade and base course operations are completed for Phase 1.

Phase 2 is anticipated to take 10 calendar days

III. Schedule II, Phase 3 – Construct Midfield Crossover Taxiway East (Construction Safety Drawing G054)

During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Runway 4L/22R, preparing subgrade, constructing base course, and constructing the new asphalt pavement section. Hauling activities will be required across the active Taxiways B and C. Aircraft will have the right of way at all times. Flaggers will be required for crossing Taxiways B and C. During this Phase Runway 4L/22R will be closed to aircraft operations. Prior to beginning work on this phase, the Contractor shall have barricades and closure X's in place in accordance with the plans.

Access for aircraft traffic across the airfield will be via Taxiways A, B, and C. Runway 4R/22L will be closed for takeoff and landing operations but will be available for taxi operations outside the designated work areas.

ARFF access to the runways will be via Taxiways A, B, or C.

Phase 3 will be completed concurrently with Phases 4, 5, and 6. Phase 3 will begin after the subgrade and base course operations are completed for Phases 4 and 5.

Phase 3 is anticipated to take 12 calendar days

IV. Schedules I and III, Phase 4 – Realignment of Taxiways D7 and D8 (Construction Safety Drawing G055)

During this phase, the Contractor will be clearing and grubbing, removing the existing portion of taxiways D7 and D8 in the area between the Runway 4R/22L safety area and Taxiway D, preparing subgrade, constructing base course, and constructing the new

asphalt pavement section for the realigned Taxiways D7 and D8. ALCMS work may also occur during this phase. Hauling activities will be required across the active Taxiways B and C. Aircraft will have the right of way at all times. Flaggers will be required for crossing Taxiways B and C. Flaggers will be required for crossing Taxiways B and C. Aircraft will have the right of way at all times. Prior to beginning work on this phase, the Contractor shall have barricades in place in accordance with the plans. All work during this phase will be completed at night between 6 pm and 6 am. Runway 4R/22L will be closed from 6 pm to 6 am. Hauling operations will cross the runway during the closure. The contractor will be required to clean any FOD, perform a FOD walk, and receive approval from the RPR/Falcon Field prior to opening the runway each morning.

Access for aircraft traffic will not be affected during this phase.

ARFF access to the runways will be via the Higley Ramp to Taxiway C, or via Taxiway B.

Phase 4 will be partially completed concurrently with Phases 3, 5, and 6. Phase 4 will begin after the completion of Phases 1 and 2.

Phase 4 is anticipated to take 102 calendar days

V. Schedule I, Phase 5 –Realignment of Taxiways D7 and D8 (Construction Safety Drawing G056)

During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Taxiway D, preparing subgrade, constructing base course, and constructing the new asphalt pavement section. Hauling activities will be required across the active Taxiways B and C. Aircraft will have the right of way at all times. Flaggers will be required for crossing Taxiways B and C. Flaggers will be required for crossing Taxiways B and C. Aircraft will have the right of way at all times. Prior to beginning work on this phase, the Contractor shall have barricades in place in accordance with the plans. All work during this phase will be completed at night between 6 pm and 6 am. Runway 4R/22L will be closed from 6 pm to 6 am. Hauling operations will cross the runway during the closure. The contractor will be required to clean any FOD, perform a FOD walk, and receive approval from the RPR/Falcon Field prior to opening the runway each morning.

Access for aircraft traffic across the airfield will be via Taxiways A, B, and C. A portion of Taxiway D will be closed during this phase. Aircraft access to Taxiway C will be via the Higley Ramp.

ARFF access to the runways will be Higley Ramp to Taxiway C, or via Taxiway B.

Phase 5 will be completed concurrently with Phases 3, 4, and 6. Phase 5 will begin after the subgrade and base course operations are completed for Phase 4.

Phase 5 is anticipated to take 27 calendar days

VI. Schedule I, Phase 6 –Realignment of Taxiways D7 and D8 (Construction Safety Drawing G057)

During this phase, the Contractor will be clearing and grubbing, removing the asphalt shoulder from Runway 4R/22L, preparing subgrade, constructing base course, and constructing the new asphalt pavement section. Hauling activities will be required across the active Taxiways B and C. Aircraft will have the right of way at all times. Flaggers will be required for crossing Taxiways B and C. During this Phase Runway 4R/22L will be closed to aircraft operations. Prior to beginning work on this phase, the Contractor shall have barricades and closure X's in place in accordance with the plans.

Access for aircraft traffic across the airfield will be via Taxiways A, B, and C. Runway 4R/22L will be closed for takeoff and landing operations, but will be available for taxi operations outside the designated work areas.

ARFF access to the runways will be Higley Ramp to Taxiway C, or via Taxiway B.

Phase 6 will be completed concurrently with Phases 3, 4, and 5. Phase 6 will begin after the subgrade and base course operations are completed for Phases 4 and 5.

Phase 6 is anticipated to take 12 calendar days

B. CONSTRUCTION SAFETY DRAWINGS

The Construction Safety Drawings (Sheets G050 through G057) are attached at the back of this document to show the phasing requirements for this project. Along with the phasing information, those attached drawings also show aircraft access routes, ARFF access routes, and contractor operation limits to help assist with airport operations and maintaining safety during this project.

3. AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY

All work within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5370-2G, Operational Safety on Airports During Construction. The contract drawings include information regarding requirements for operational safety on the airport during construction.

The Contractor shall prepare a detailed Safety Plan Compliance Document (SPCD) as stated in the Advisory Circular 150-5370-2G. The Contractor's SPCD shall identify specific methods, sequencing, phasing that he/she intends to use in order to accomplish the project work. The SPCD shall be submitted by the Contractor to the City of Mesa for approval prior to the pre-construction conference for the project. The City of Mesa will review the SPCD with the Engineer and supply any changes or revisions to the Contractor for incorporation into the plan. The final SPCD shall be the result of a coordinated effort between the Owner/Sponsor, the Engineer and the Contractor.

The Contractor shall adhere to the approved SPCD as agreed upon by Airport Staff, Engineer, and Contractor. Modifications or deviations from the approved safety plan shall be submitted to the Engineer for review and approval prior to implementation.

A. IDENTIFICATION OF AFFECTED AREAS

Areas affected by construction activities associated with this project are identified on the Construction Safety Drawings. Construction activities associated with Schedule I will be the Realignment of Taxiways D7 and D8 and Schedule II will be the Midfield Crossover Taxiway East. Section 2 of this document and the attached Construction Safety Drawings describe in detail which areas are affected and for what durations.

B. MITIGATION OF EFFECTS

To mitigate the effects of the construction activities associated with the project; alternative routes have been established for emergency and ARFF vehicles, aircraft taxiway movements have been considered and phasing plans have been created. Because the phasing for this project is critical to maintaining safety and operations at the airport during construction, adhering to the requirements as laid out in the attached phasing sheets is imperative. To help assist all individuals with this process, it is important that all airport personnel, air traffic operation personnel, contractor personnel, and engineering personnel discuss current and upcoming phases during the required weekly construction progress meetings as mentioned in Section 1 of this document.

4. PROTECTION OF NAVIGATION AIDS (NAVAID'S)

The Contractor should be aware of the location of all NAVAID equipment as haul roads are being established in order to ensure that this equipment will be protected for the duration of the project. Should any haul road pass near existing airport NAVAID equipment, the Contractor shall protect these structures from damage. Any damage to any airport NAVAID equipment due to construction activities shall be repaired by the Contractor to the satisfaction of the Engineer at no additional cost to the Sponsor. Because the majority of the construction operations are not on or near the active runways, there should not be any impact to NAVAIDS for this project.

5. CONTRACTOR ACCESS

Prior to any construction commencing, the Contractor and all employees of the Contractor will be required to attend an informational session with the Airport and Engineer to discuss site familiarization.

The Contractor will be required to submit to Airport staff prior to the commencement of construction, evidence in the form of a certification letter that all of their employees who will have unescorted access to the Airport Operations Area (AOA) have been checked for employment, security, and criminal history for the last ten years. The letter will also certify that these employees meet all security regulations as required by the Sponsor's security program. No person shall enter the worksite without authorization. Any person found with in the worksite without proper identification shall be considered unauthorized and shall be removed from the worksite.

When access is required within the AOA, the Contractor shall ensure no breaches of airport security occur at the Contractor AOA access point. Access into the AOA will occur through the gate shown on the Construction Phasing Plans attached at the back of this document. The gate will remain closed and locked or a gate guard will be provided at the Contractor's expense. During times of infrequent construction traffic the gate shall be closed, even when a gate guard is present. At such times as this gate is not guarded, it shall be closed and securely locked. The Contractor will furnish gate guards with

rosters of his/her personnel and ensure each individual has appropriate identification. The Contractor will provide duplicate keys for the lock to the Airport.

During daylight hours, all authorized vehicles and construction equipment must display a three-foot by three-foot flag with international orange and white 12-inch squares displayed in full view above the vehicles or rotating beacons. During night time operations only lighted rotating beacons are acceptable. Passengers in any authorized vehicles shall be the responsibility of the Contractor. The gate guard shall allow no unauthorized vehicle or person to enter the AOA side of the airport without the above stipulated security clearance. The Contractor and the Contractor's gate guard shall be held duly responsible to uphold the above security stipulations at all times during the progress of the construction project. No deviations from these security measures shall be allowed at any time. Failure to follow these security measures may result in loss of escort privileges and/or fines.

A. LOCATION OF STOCKPILED CONSTRUCTION MATERIALS

The Contractor's staging area is shown on the Construction Phasing Drawing (Sheet G050) and is located to the northeast of the Schedule II project area inside of the airport operations area (AOA). All material storage and staging will occur in this area. The Contractor will not be allowed to stockpile any materials or equipment outside of the Contractor Staging Area without the approval of the City Engineer/City Inspector. At no time will the stockpiling of material or equipment be allowed within an Object Free. Maximum stockpile height will be 10-feet within the staging area.

B. VEHICLE AND PEDESTRIAN OPERATIONS

I. Construction Site Parking

Construction site parking will be within the staging area as shown on the Construction Phasing Drawing (Sheet G050). Contractor employees shall park outside the airfield and must be brought to the project site by shuttle or other approved means.

II. Construction Equipment Parking

Construction equipment parking will be allowed at the contractor's staging area in the same location as shown on the Construction Phasing Drawings (Sheet G050), or at a location approved by the City Engineer/City Inspector. If the equipment must be parked in an Airport Operations Area (AOA), the equipment must be lighted with a beacon per AC 150/5370-2G. No equipment or material shall be parked or stored in any runway or taxiway safety area or object free area.

III. Access and Haul Roads

The Contractor shall obtain approval from the Engineer prior to establishing haul roads within the airport property. Once established, the haul roads shall be utilized for all equipment traffic, and the equipment shall not be allowed to stray or wander away from the established routes. The haul roads shall be the responsibility of the Contractor and shall be maintained and kept in good order at all times. When required, water shall be applied at the locations and in the amounts necessary to minimize dust and dirt in the air operations area. Since construction operations will be within active airport operation areas, the airport will require additional dust control measures be used on haul roads and

the work area in order to not interfere with airport operations. Haul roads that cross any active taxiway, movement areas, non-movement areas or active areas of the ramp shall be kept clean and in good order at all times. The Contractor shall be prepared at all times to repair any damage caused by the movement of equipment on any of the haul roads at the direction of the Engineer, whether in designated or undesignated areas. After completion of the project, the Contractor shall be required to regrade any unpaved portions of the haul road and to reseed the area with local native grasses to match the existing conditions of the area. The performance of any work as specified by this provision, including watering, maintenance, and repair of the haul roads, shall not be measured and paid for directly, but shall be considered as necessary and incidental to the work.

Establishment of haul roads off of Airport property shall be the sole responsibility of the Contractor.

Contractor movement shall be restricted to the pre-determined access routes as shown on the attached Construction Safety Drawings and within the work area. Work areas shall be delineated with barricades as shown on the phasing drawings. The Contractor shall not operate outside of these areas without approval of the Engineer or Airport Operations Supervisor/Forman. The Contractor's operators shall be aware the haul route shown is also utilized by other vehicles not associated with the construction.

Passengers in any authorized vehicles shall be the responsibility of the Contractor. No deviations from these security measures shall be allowed at any time.

Haul truck drivers are not required to obtain an Airport badge but are required to check in with the Contractor's gate guard. The driver shall be issued an orange/white checkered flag to be mounted on the highest point of the truck and shall be returned to the security guard upon leaving the site through the access gate. At no time shall a driver unfamiliar with the worksite be allowed to deviate from the marked haul route.

IV. Marking and Lighting of Vehicles

All vehicles operating within the AOA and in the movement/non-movement areas must clearly identify themselves for control purposes. The identification symbols should be a minimum 8-inch block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable. Solid black or solid white painted vehicles are not allowed within the AOA.

To operate within the AOA during daylight hours, the vehicle must have a flag (day only) or yellow flashing light (day or night) attached to it. Any vehicle operation within the AOA during hours of darkness or reduced visibility must be equipped with a yellow flashing light. Flashing lights must be mounted on the uppermost part of the vehicle structure. Flags shall be at least 3-foot by 3-foot square having a checkered pattern of international orange and white squares at least 1 foot on each side.

V. Description of Proper Vehicle Operations

Proper vehicle operations are described as conforming to all rules and regulation for driving as directed by the Falcon Field Airport.

VI. Required Escorts

All persons authorized access to the worksite shall be familiar with the current phase or work haul route or be escorted by a person familiar with the project site authorized to escort. Persons authorized to provide escorts include Airport staff and designated contractor supervisors. The number of personnel being escorted shall not exceed ten (10) personnel: this includes vendors, subcontractors, and part time workers. Failure to provide an escort can result in loss of escort privileges and/or fines.

When any vehicle, other than one that has prior approval from the airport operator, must travel over any portion of an aircraft movement area, the vehicle will be escorted and properly identified. To operate in those area during daylight hours, the vehicle must have a flag (day only) or beacon (day or night) attached to it. Any vehicle operation on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light.

VII. Training Requirements of Vehicle Drivers

The Airport's vehicle rules and regulations will apply to all personnel that plan on operating a vehicle in the active AOA. The rules and regulations will be explained during the preconstruction meeting and informational session prior to commencement of construction.

VIII. Situational Awareness

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify movement/position of all escorted vehicles at any given time.

IX. Two-way Radio Communication Procedures

The Contractor's employees will not communicate via radio with Airport Operations and/or the Air Traffic Control Tower. The contractor's employees including flaggers, spotters, and observers controlling equipment crossing active aircraft areas will receive training and are required to have a fully operational Airport-approved radio to listen to the Air Traffic Control Tower. They shall be familiar with radio call signs, channels and phone numbers. All observers and flaggers shall immediately contact Airport Operations if any equipment or vehicle becomes disabled or is unable to yield to aircraft for any reason, or there is any other situation that may pose a danger to aircraft traffic.

Contractor employees that have a radio are to telephone equipment to contact Airport Operations and the Contractor Superintendent of any security violation or threat to airport safety. Report any failure of any equipment immediately.

X. Maintenance of the Secured Area of the Airport

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of

construction vehicles or personnel. Throughout the duration of construction, it is anticipated that there will only be one access point for construction personnel. This access point will consist of a gate as shown in the Construction Safety Drawings. The gate will be equipped so that it can be securely closed and locked to prevent unauthorized access. During hauling activities, a gate guard will be positioned at the gate. During times of infrequent hauling the gate shall be closed, even when the gate guard is present.

In addition, all personnel be familiar with the project site or escorted while working in the AOA. Escorted personnel must stay nearby the responsible personnel at all times to ensure that security at the Airport is maintained.

XI. Construction Site Safety

All personnel working on the construction site, including gate guards, are recommended to have personal protective equipment on at all times. This includes but is not limited to vests, hard hats, hearing protection, and eye protection.

6. WILDLIFE MANAGEMENT

All wildlife management within the Airport Operations Area shall be accomplished in conformance to Advisory Circular 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*, and Certalert 98-05, *Grasses Attractive to Hazardous Wildlife*. In general, the Contractor must carefully control and continuously remove waste or loose material that might attract wildlife.

A. TRASH

The Contractor is responsible to complete a daily inspection or more frequently, if deemed necessary by the City Engineer/City Inspector, of the construction site (including the Contractor's Staging Area) for any trash or objects that might attract wildlife.

B. STANDING WATER

Because standing water can attract wildlife, the Contractor is responsible to complete a daily inspection of the construction site for any standing water. With the discretion of the City Engineer/City Inspector, the Contractor shall remove this hazard.

C. TALL GRASS AND SEEDS

The Contractor will install soil, seeding and hydromulch as specified in the *T-901 Seeding* specification for this project or as directed by the Engineer.

D. POORLY MAINTAINED FENCING AND GATES

The Contractor shall be required to maintain all fences and gates throughout the duration of the project, to the satisfaction of the City Engineer/City Inspector.

E. DISRUPTION OF EXISTING WILDLIFE HABITAT

The Contractor shall notify the City Engineer/City Inspector when a wildlife sighting has occurred on the project site to mitigate any disruption to the existing wildlife habitat.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

The presence of FOD on the apron is a significant safety concern, as debris can be ingested into an aircraft's engine causing extensive damage or can be launched across the apron by jet blast, potentially causing bodily injury or damaging other aircraft. Materials capable of creating FOD must be continuously removed during the construction project. The Contractor is required to keep all taxiways and aprons, open to aircraft free from FOD at all times. The Contractor is required to maintain FOD control continually and to the satisfaction of the City Engineer/City Inspector. FOD Control measures shall include the use of power brooms, FOD boss, and manual removal as well as any other means deemed necessary. Prior to opening any pavement to aircraft, the Contractor shall conduct a sweep of the pavement to verify that it is FOD free.

8. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

Although hazardous material is not anticipated to be present on this project, if hazardous material is encountered, the Contractor shall inform the City Engineer/City Inspector and ARFF immediately. Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean up spills resulting from fuel or hydraulic fluid leaks.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

Prior to commencing any construction activities as well as prior to beginning a new construction phase the Contractor shall notify the City Engineer/City Inspector and Airport Operations 72 hours in advance. During construction activities the Contractor shall immediately notify the City Engineer/City Inspector and Airport Operations of any conditions that may adversely affect the operational safety of the Airport.

A. LIST OF RESPONSIBLE REPRESENTATIVES/POINTS OF CONTACT

Agency Name	Type of Agency	Telephone No.
Airport Emergency	Aircraft Rescue and Fire Fighting	911
Mesa Police Department	Police Department	(480) 644-2211 Or 911
Mesa Fire Department	Fire Department	(480) 644-2211 Or 911
Mountain Vista Medical Center	General Hospital	(480) 358-6100 Or 911
Airport Administrative/Badging	Airport Administration	(480) 644-2450
Airport Operations	Airport Operations	(480) 644-4230

B. NOTICES TO AIR MISSIONS (NOTAM)

Only the airport operations staff may initiate or cancel NOTAM's on airport conditions and is the only entity that can close or open a runway or taxiway. The operations staff must coordinate the issuance, maintenance, and cancellation of NOTAM's about airport conditions resulting from construction activities and must provide information on closed or hazardous conditions on airport movement areas so it can issue a NOTAM. The Contractor must notify the City Engineer/City Inspector and Operations Manager when scheduling/scoping for the project has changed that would require a modification to the NOTAM's.

C. EMERGENCY NOTIFICATION PROCEDURES

In an event of an emergency, the Contractor shall notify the City Engineer/City Inspector and Airport staff. If necessary, the Contractor shall contact 911 and Airport Emergency.

D. COORDINATION WITH ARFF PERSONNEL

In an event that the Contractor must coordinate construction activities with ARFF Personnel, the Contractor will notify Airport staff or City Engineer/City Inspector. The Airport staff or City Engineer/City Inspector will be responsible to notify the event to ARFF Personnel. There are no planned interruptions to water lines associated with this project.

E. NOTIFICATION TO THE FAA

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment.

No shutdowns of NAVAID's are anticipated for the duration of this project.

10. INSPECTION REQUIREMENTS

A. DAILY (OR MORE FREQUENT) INSPECTIONS

Inspections shall be conducted daily and more frequently, if necessary, by the City Engineer/City Inspector to ensure conformance with this document. The checklist provided at the end of this report was copied from FAA AC 150/5370-2G Appendix 4, *Construction Project Daily Safety Inspection Checklist*. This checklist shall be completed by the Contractor to the Engineer's satisfaction and the Contractor shall submit a copy of all the completed checklists to the Engineer and the Airport Operations Supervisor/Forman. The Contractor should fill out this checklist everyday construction operations occur on this project.

B. FINAL INSPECTIONS

Final inspections shall be conducted after every construction phase is complete as detailed in Section 2 of this document. The final inspection should be completed with the Contractor, City Engineer/City Inspector, and Airport Operations Supervisor/Forman.

11. UNDERGROUND UTILITIES

Prior to beginning excavation activities, the Contractor shall notify the City Engineer/City Inspector and Airport Operations at least 3 working days prior to the scheduled excavation. The FAA shall attempt to locate all of their underground cables that are located in the vicinity of the work areas, prior to construction in the area. The Contractor shall attempt to locate the Sponsor's underground cables and other sub-surface utilities prior to construction. Damage to the underground cables, whether FAA's or Sponsor's, through negligence on the part of the Contractor will require replacement by the Contractor at no cost to the Sponsor. Any splicing or replacing of damaged cable shall meet current FAA specifications. Damage to other underground utilities through Contractor's negligence shall be repaired according to the relevant utility's standards and at no cost to the Sponsor.

12. PENALTIES

All penalties are specified under the Contract Documents for this project.

13. SPECIAL CONDITIONS

In the event of an aircraft emergency, the Contractor's personnel and/or equipment may be required to immediately vacate the area. This means that the Contractor shall then immediately cease all operations and move all personnel and equipment outside of the safety areas of the runway and any taxiways. This project has been set up to minimize the chance that the Contractor will be required to deal with an aircraft emergency with the following provisions.

14. RUNWAY AND TAXIWAY VISUAL AIDS

A. EQUIPMENT AND METHODS FOR COVERING SIGNAGE AND AIRFIELD LIGHTS

The Contractor will install approved lighted, low-profile barricades, as shown on the Construction Phasing drawings in the plan set, to designate these areas as closed. In addition to the barricades, the Contractor will need to cover any taxiway lights/signs identified on the plan sheets that indicate/direct traffic to closed pavements. The Contractor shall submit a plan to the Engineer for approval proposing how these lights and signs might be covered. In the past, black plastic, non-transparent bags have worked well to cover the signs and 6" PVC pipe cut into appropriate lengths and slipped over the top of the taxiway edge lights has been approved.

B. EQUIPMENT AND METHODS FOR TEMPORARY CLOSURE MARKINGS (PAINT, FABRIC, OTHER)

The procedure to close off the ramp for construction shall consist of placing barricades and flashers on the perimeter of the construction area as shown in the phasing plan sheets at the end of this document or as directed by the Engineer.

C. TYPES OF TEMPORARY VISUAL GUIDANCE SLOPE INDICATORS (VGSI)

This is not applicable to the project.

15. MARKING AND SIGNS FOR ACCESS ROUTES

All required signs and markings shall conform to Advisory Circular 150/5340-18, *Standard for Airport Sign Systems*, and to the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD), to the extent possible. Signs adjacent to areas used by aircraft must comply with the frangible requirements as stated in Advisory Circular, *Frangible Connections*. The location and design of any signs will be directed by the Engineer or Operations Manager and provided by the Contractor.

16. HAZARD MARKINGS AND LIGHTINGS

A. PURPOSE

The hazard marking and lighting prevents pilots from entering areas closed to aircraft and prevents construction personnel from entering areas open to aircraft. Prior to construction on or adjacent to any taxiway or apron, the Contractor shall, upon approval by the Engineer, close the taxiway and/or apron, in accordance with the specific phasing plan associated with that phase, prior to beginning work. The Contractor shall be responsible for clearly marking and defining the closed taxiways by use of warning lights, barricades, flags and closed taxiway or runway markings in conformance with Advisory Circular 150/5370-2G. The Contractor shall be responsible for maintaining these barricades and keeping them clearly visible at all times.

Specific marking and lighting equipment details, location and other pertinent information regarding hazard marking materials including low-profile barricades are shown on the Construction Safety Drawings, attached to the back of this document. Please note that each phase may have unique details. Additionally, prior to any deviations in location or type of hazard marking materials shall be coordinated with the City Engineer/City Inspector and Airport Operations.

B. EQUIPMENT

Approved low-profile barricades are to identify and define the limits of construction and hazardous areas on airports. Physical requirements and spacing of the barricades are specified in the construction drawings for this project. The barricades must be weighted down per the manufacturer's recommendations to prevent the barricades from moving due to wind or jet blast.

The flashing lights on the approved barricades must meet the luminance requirement of the Arizona Department of Transportation (ADOT). The flashing lights must be red or an approved equal. Orange flags shall be utilized on the opposite end of the barricades as well.

17. PROTECTION OF RUNWAY AND TAXIWAY AREAS

A. RUNWAY SAFETY AREA (RSA)

The Airport defines the Safety Area as the area that is within 150 feet from the centerline of Runway 4R/22L, and 120 feet from the centerline of Runway 4L-22R. Due to the areas of construction, equipment will be required Runway Safety Areas. When work is required in the safety area of a runway, the runway will be closed to takeoff and landing operations.

B. RUNWAY OBJECT FREE AREA (ROFA)

The Airport defines the Object Free Area as the area that is within 250 feet from the centerline of Runway 4R/22L and 200 feet from the centerline of Runway 4R/22L. Work will be required with the Object Free Areas of both runways at various times.

No stockpiling of material will be allowed within the ROFA. Additionally, any equipment not currently being utilized will be removed from the ROFA.

Any embankments in the ROFA would require submitting the 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

C. TAXIWAY SAFETY AREA (TSA)

The Airport defines the Safety Area for Taxiway D as the area that is within 39.5 feet from the centerline of Taxiway D. It is anticipated that no construction activities will be within the Taxiway Safety Area.

Open trenches and excavations are not permitted within the TSA while the taxiway is open. If possible, backfill trenches before the taxiway is opened. If the taxiway must be opened before excavations are backfilled, cover the excavations appropriately.

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

D. TAXIWAY OBJECT FREE AREA (TOFA)

The Airport defines the Object Free Area for Taxiway D as the area that is within 57.5 feet from the centerline of Taxiway D.

Construction activity during this project shall not be allowed inside the TOFA while the taxiway is open. NOTAM's will be required to coordinate the closures of the taxiways that will be necessary to complete work inside the TOFA. Signs/embankments/equipment within the TOFA must comply with the frangible requirements as stated in Advisory Circular, *Frangible Connections.*

E. OBSTACLE FREE ZONE (OFZ)

The Airport defines the Obstacle Free Zone as the area that is within 250 feet from the centerline of Runways 4R/22L and 4L/22R. Personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If it is necessary to enter the OFZ, it would be necessary to coordinate with the FAA.

F. RUNWAY APPROACH/DEPARTURE SURFACES

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirement," of Advisory Circular 150/5300-13.

18. OTHER LIMITATIONS ON CONSTRUCTION

A. PROHIBITIONS

The use of open flame welding or torches is prohibited unless adequate fire safety precautions are provided and the Airport Operations Supervisor/Forman has approved their use. The use of flare pots within the AOA is prohibited at all times. The use of electrical blasting caps is prohibited on or within 1,000 feet of the Airport property.

B. RESTRICTIONS

Construction suspension may be required during specific Airport operations. Project areas may be worked on simultaneously only if approved by the City Engineer/City Inspector and Airport Operations Supervisor/Forman. Night construction may only be performed if approved by the City Engineer/City Inspector and Airport Operations Supervisor/Forman. Construction operations shall only be allowed in weather conditions compliant with the project specifications.

NOTE: This Appendix D. Construction Project Daily Safety Inspection Checklist was copied from FAA Advisory Circular 150/5370-2G (dated December 13, 2017) and formatted for use with individual projects.

Airport: **Falcon Field Airport**
AIP Project No.: **3-04-0023-035-2023**
Project Name: **Midfield Crossover Taxiway East and Realignment of Taxiways D7 and D8**
Date: _____

Appendix D. Construction Project Daily Safety Inspection Checklist

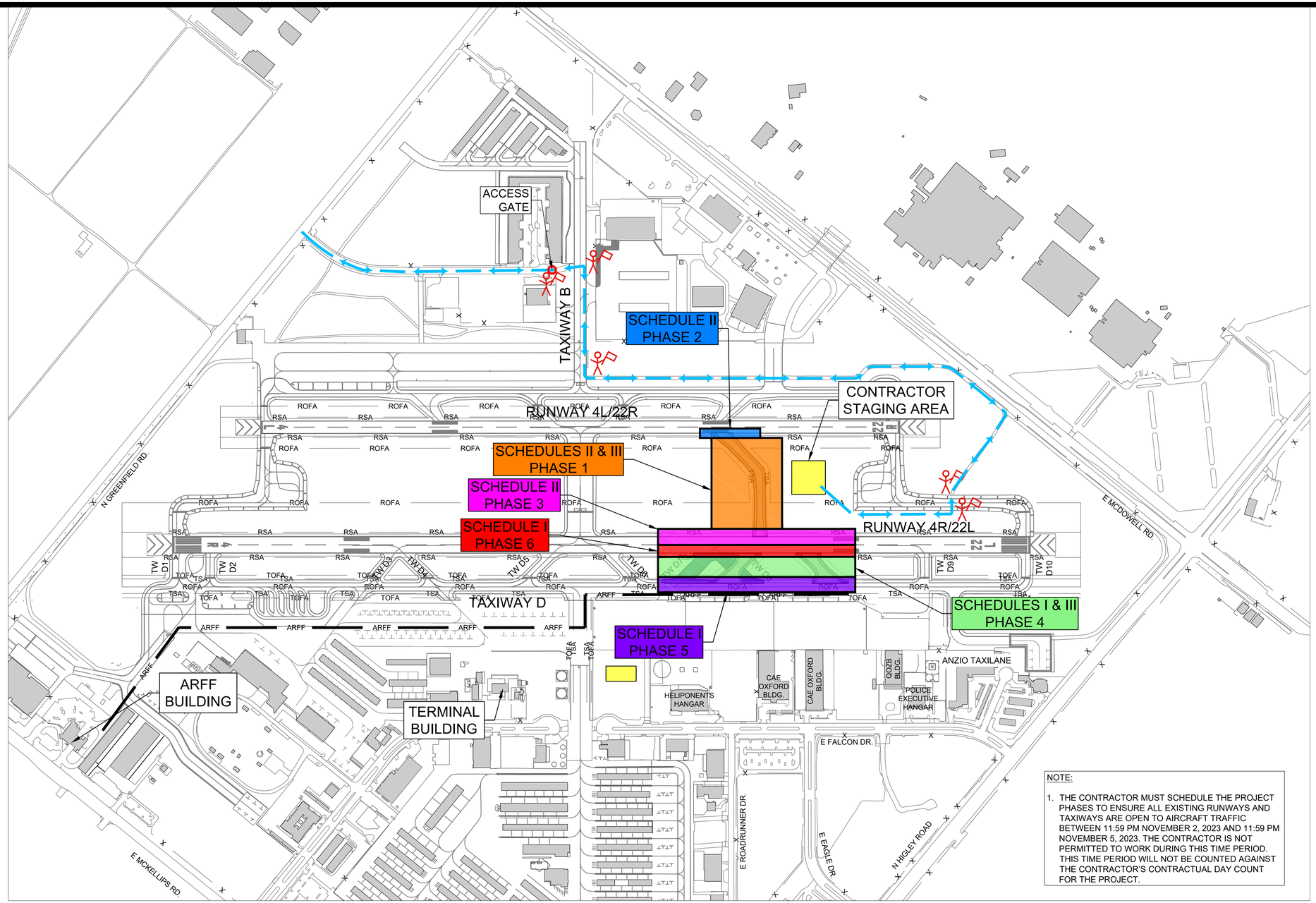
The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		☐
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		☐
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		☐
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		☐
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		☐
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and approach zones.		☐

Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		☐
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		☐
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		☐
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		☐
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		☐
Obliterated or faded temporary markings on active operational areas.		☐
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		☐
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		☐
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		☐
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		☐
Lack of radio communications with construction vehicles in airport movement areas.		☐

Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		☐
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		☐
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		☐
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		☐
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		☐
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		☐
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		☐
Site burning, which can cause possible obscuration.		☐
Construction work taking place outside of designated work areas and out of phase.		☐

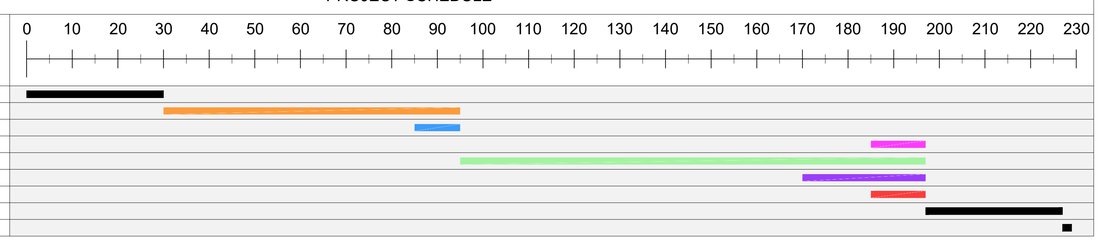


NOTE:

1. THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

PROJECT SCHEDULE

SCHEDULE / PHASE	DURATION
ADMINISTRATIVE PHASE	30 CALENDAR DAYS
SCHEDULES II & III, PHASE 1	65 CALENDAR DAYS
SCHEDULE II, PHASE 2	10 CALENDAR DAYS
SCHEDULE II, PHASE 3	12 CALENDAR DAYS
SCHEDULES I & III, PHASE 4	102 CALENDAR DAYS
SCHEDULE I, PHASE 5	27 CALENDAR DAYS
SCHEDULE I, PHASE 6	12 CALENDAR DAYS
PERMANENT PAINT DELAY	30 CALENDAR DAYS
PERMANENT PAINT	2 CALENDAR DAYS



SAFETY & OBJECT FREE AREAS

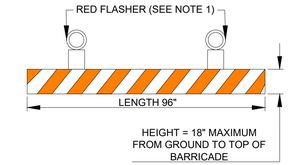
RUNWAY 4R/22L B-II	
RUNWAY SAFETY AREA (RSA)	75' FROM RW CENTERLINE
RUNWAY EXTENDED SAFETY AREA (RSA)	300' FROM RW END
RUNWAY OBJECT FREE AREA (ROFA)	250' FROM RW CENTERLINE
RUNWAY 4L/22R B-I	
RUNWAY OBJECT FREE AREA (RSA)	60' FROM RW CENTERLINE
RUNWAY EXTENDED SAFETY AREA (RSA)	240' FROM RW END
RUNWAY OBJECT FREE AREA (ROFA)	125' FROM CENTERLINE
TAXIWAYS G, D7 AND D8 (ADG II, TDG-2A)	
TAXIWAY SAFETY AREA (TSA)	79'
TAXIWAY OBJECT FREE AREA (TOFA)	124'

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLGGER / GATE GUARD
- CONTRACTOR GATE ACCESS





1. FLASHER BARRICADES WILL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR AT ALL TIMES. CONTRACTOR SHALL ALSO PROVIDE SPARE BARRICADES, BATTERIES, AND LIGHT BULBS FOR MAINTENANCE DURING NIGHTTIME HOURS.
2. LOW-PROFILE BARRICADES TO BE PLACED WITH 10' INTERVALS ADJACENT TO CONSTRUCTION, AS DIRECTED BY THE RPR/FALCON FIELD.
3. BARRICADES ARE TO BE PLACED IN LOCATIONS SHOWN ON THE PLANS AND AS DIRECTED BY THE RPR/FALCON FIELD THROUGHOUT ALL PHASES OF THE PROJECT. THE BARRICADE LOCATIONS PROVIDED ON THIS SHEET SHALL REMAIN THROUGHOUT CONSTRUCTION. ADDITIONAL BARRICADES WILL BE REQUIRED ACROSS PHASE SPECIFIC AREAS OF CLOSED PAVEMENT, AND ARE SHOWN ON PHASING SHEETS.
4. FLASHER BARRICADES WILL BE REQUIRED ALONG THE EDGE OF ANY VERTICAL DROP OFF GREATER THAN 3". AIRPORT OPERATIONS WILL ISSUE NOTAM TO ADVISE AIRCRAFT OF THIS CONDITION
5. FLASHER BARRICADES ARE TO BE ADEQUATELY WEIGHTED SO THEY WILL REMAIN IN PLACE DURING TIMES OF HIGH WINDS OR AS APPROVED BY THE RPR/FALCON FIELD.

1 FLASHER BARRICADE
NTS

GRAPHIC SCALE
300 0 300 600
(IN FEET)
1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING OVERALL SCHEDULES AND PHASE PLAN

DRAWING G050

SHEET 8 OF 52

CATALOG NUMBER: A-270527

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\0000-FFZ-MCTE-G050-CPLN.DWG

1. COORDINATION

ALL COORDINATION WILL TAKE PLACE THROUGH THE RPR/FALCON FIELD. NO CLOSURES WITHIN THE MOVEMENT AREAS WILL BE PERMITTED WITHOUT A NOTAM IN PLACE FOR EACH SPECIFIC CLOSURE. PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL GIVE 72 HOURS ADVANCE NOTICE TO THE RPR/FALCON FIELD FOR FILING OF ALL NOTAMS.

A WEEKLY CONSTRUCTION PROGRESS MEETING WILL BE REQUIRED TO DISCUSS ALL OPERATIONAL SAFETY TOPICS THAT HAVE BEEN AFFECTED OR WILL BE AFFECTED IN THE NEAR FUTURE.

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RPR IMMEDIATELY. ALL PARTIES WILL EVALUATE THE IMPACT OF THE CHANGE AND WILL DETERMINE THE MEASURES NEEDED TO MAINTAIN A SAFE CONSTRUCTION SITE.

THE FAA AIR TRAFFIC OPERATORS WILL BE NOTIFIED IMMEDIATELY IF ANY CHANGES AFFECT AIRCRAFT MOVEMENT. ALL COMMUNICATIONS WITH THE FAA TOWER WILL BY HANDLED BY AIRPORT OPERATIONS.

AIRPORT RUNWAYS AND TAXIWAYS SHOULD REMAIN IN USE BY AIRCRAFT TO THE MAXIMUM EXTENT POSSIBLE.

AIRCRAFT USE OF AREAS NEAR THE CONTRACTOR'S WORK SHOULD BE CONTROLLED TO MINIMIZE DISTURBANCE TO THE CONTRACTOR'S OPERATION.

CONSTRUCTION THAT IS WITHIN THE SAFETY AREA OF AN ACTIVE RUNWAY, TAXIWAY, OR APRON MUST BE PERFORMED WHEN THE RUNWAY, TAXIWAY, OR APRON IS CLOSED OR USE-RESTRICTED AND INITIATED ONLY WITH PRIOR PERMISSION FROM THE AIRPORT OPERATOR AND WITH PROPER NOTAMS IN PLACE.

THE CONTRACTING OFFICER, AIRPORT OPERATOR, OR OTHER DESIGNATED AIRPORT REPRESENTATIVE MAY ORDER THE CONTRACTOR TO SUSPEND OPERATIONS; MOVE PERSONNEL, EQUIPMENT, AND MATERIALS TO A SAFE LOCATION; BARRICADE ANY OPEN TRENCHES AND STAND BY UNTIL AIRCRAFT USE IS COMPLETED.

2. PHASING

THIS PROJECT CONSISTS OF 3 PHASES. SEE CONSTRUCTION SAFETY DRAWINGS FOR PHASING REQUIREMENTS.

3. AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY

ALL WORK WITHIN AIRPORT OPERATIONS AREA (AOA) SHALL CONFORM TO ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

CONTRACTOR SHALL ADHERE TO REQUIREMENTS AS MENTIONED ON THIS SHEET, THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), AND CONSTRUCTION SAFETY DRAWINGS. THESE REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO, LIFE & SAFETY ACCESS ROUTES, AIRCRAFT ROUTES, PEDESTRIAN ROUTES, CONSTRUCTION ACCESS ROUTES, CONSTRUCTION LIMITS, AND BARRICADE LOCATIONS.

4. CONTRACTOR ACCESS

CONTRACTOR HAS ACCESS TO ONE (1) GATE TO ENTER THE AIRPORT. SEE CONSTRUCTION SAFETY DRAWINGS FOR GATE LOCATION. CONTRACTOR SHALL PROVIDE A GATE GUARD AT THIS GATE AT ALL TIMES WHEN GATE IS NOT CLOSED AND LOCKED.

CONTRACTOR MOVEMENT SHALL BE RESTRICTED TO THE PRE-DETERMINED ACCESS ROUTES AS SHOWN ON CONSTRUCTION SAFETY DRAWINGS.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST BE IDENTIFIED CLEARLY WITH 8-INCH (MINIMUM) BLOCK-TYPE CHARACTERS OF A CONTRASTING COLOR AND EASY TO READ.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST HAVE FLAG (DAY ONLY) OR BEACON (DAY AND NIGHT) ATTACHED TO THE VEHICLE.

VEHICLE TRAFFIC LOCATED IN OR CROSSING AN ACTIVE MOVEMENT AREA MUST BE ESCORTED BY AIRPORT OPERATIONS WHO WILL BE IN RADIO CONTACT WITH THE TOWER. THE DRIVER, THROUGH PERSONAL OBSERVATION, SHOULD CONFIRM THAT NO AIRCRAFT IS APPROACHING THE VEHICLE POSITION. CONTRACTOR PERSONNEL MAY OPERATE IN THE MOVEMENT AREA WITHOUT TWO-WAY RADIO COMMUNICATION PROVIDED A NOTAM IS ISSUED CLOSING THE AREA AND THE AREA IS PROPERLY MARKED TO PREVENT INCURSIONS. CONTINUOUS MONITORING IS REQUIRED ONLY WHEN EQUIPMENT MOVEMENT IS NECESSARY IN CERTAIN AREAS. CONTRACTOR SHALL NOT COMMUNICATE DIRECTLY WITH THE TOWER OR CTAF. ALL TOWER COMMUNICATION SHALL BE PERFORMED BY AIRPORT OPERATIONS.

CONTRACTOR IS REQUIRED TO NOTIFY AND COORDINATE WITH THE RPR AND AIRPORT OPERATIONS PRIOR TO ENTERING ANY ACTIVE SURFACE SAFETY AREAS OR OBJECT FREE AREAS.

CONTRACTOR, SUBCONTRACTOR, AND SUPPLIER EMPLOYEES OR ANY UNAUTHORIZED PERSONS ARE RESTRICTED FROM ENTERING AN AIRPORT AREA THAT WOULD BE HAZARDOUS.

5. WILDLIFE MANAGEMENT

CONTRACTOR SHALL ADHERE TO ALL WILDLIFE MANAGEMENT PRACTICES AS STATED IN ADVISORY CIRCULAR 150/5200-33B, HAZARDOUS WILDLIFE ATTRACTIONS ON OR NEAR AIRPORTS, AND CERTALERT 98-08, GRASSES ATTRACTIVE TO HAZARDOUS WILDLIFE.

CONTRACTOR IS RESPONSIBLE FOR COMPLETING A DAILY INSPECTION FOR TRASH, FOREIGN OBJECTS, AND STANDING WATER ON THE CONSTRUCTION SITE THAT MIGHT ATTRACT WILDLIFE.

CONTRACTOR SHALL MAINTAIN ALL FENCES AND GATES THROUGHOUT THE PROJECT TO THE SATISFACTION OF THE RPR.

CONTRACTOR SHALL NOTIFY THE RPR WHEN A WILDLIFE SIGHTING HAS OCCURRED ON THE PROJECT SITE.

6. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

CONTRACTOR SHALL KEEP ALL PAVEMENTS IN THE AOA INCLUDING APRONS, TAXIWAYS, AND RUNWAYS FREE FROM FOD AT ALL TIMES TO PREVENT ANY DEBRIS FROM BEING INGESTED INTO AN AIRCRAFT'S ENGINE OR ANY DEBRIS FROM BEING LAUNCHED DUE TO JET BLAST.

CONTRACTOR IS REQUIRED TO CONTINUOUSLY MONITOR AND MAINTAIN FOD TO THE SATISFACTION OF THE RPR.

PRIOR TO OPENING ANY PAVEMENT TO AIRCRAFT, THE CONTRACTOR, RPR, AND AIRPORT OPERATIONS SHALL CONDUCT A SWEEP OF THE PAVEMENT TO VERIFY THAT THE PAVEMENT IS FREE FROM FOD.

THE CONTRACTOR IS ADVISED THAT DUST CONTROL, CLEANUP OF ACTIVE PAVEMENTS, TRACKING DEBRIS ONTO ACTIVE PAVEMENT AND GENERAL JOBSITE CLEANLINESS IS A SERIOUS SAFETY CONCERN. FOREIGN OBJECT DEBRIS (FOD) IS CONSIDERED AS ANY ITEM THAT COULD POSSIBLY IMPACT THE OPERATIONS OF AN AIRPORT OR ROADWAY. FOD COULD CAUSE INJURY OR DEATH THROUGH INGESTION IN MOVING AIRCRAFT ENGINES. SPECIFIC ITEMS OF CONCERN INCLUDE, BUT ARE NOT LIMITED TO; ANY PACKAGING FROM MATERIAL INSTALLATION, GRAVEL LEFT ON ACTIVE PAVEMENTS, DUST TRACKED ONTO ACTIVE PAVEMENTS, HAND TOOLS, HARDWARE DROPPED, ETC.

7. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

CONTRACTOR SHALL NOTIFY RPR AND AIRPORT EMERGENCY PERSONNEL IF HAZARDOUS MATERIALS ARE ENCOUNTERED ON THIS PROJECT.

8. NOTIFICATION OF CONSTRUCTION ACTIVITIES

AGENCY NAME	AGENCY TYPE	TELEPHONE
AIRPORT EMERGENCY	24 HOUR AIRPORT OPERATIONS	(640) 540-6612 OR 911
MESA POLICE DEPARTMENT	SHERIFF / POLICE	(480) 644-2211 OR 911
MESA FIRE DEPARTMENT	FIRE RESCUE	(480) 644-2211 OR 911
MOUNTAIN VISTA MEDICAL CENTER	GENERAL HOSPITAL	(480) 358-6100 OR 911
AIRPORT ADMINISTRATION/ BADGING	AIRPORT ADMINISTRATION	(480) 644-2450
AIRPORT OPERATIONS	AIRPORT OPERATIONS	(480) 644-2450

BEFORE BEGINNING ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR MUST, THROUGH THE RPR AND AIRPORT OPERATIONS, GIVE NOTICE USING THE NOTICE TO AIRMEN (NOTAM) SYSTEM OF PROPOSED LOCATION, TIME, AND DATE OF COMMENCEMENT OF CONSTRUCTION. ALL NOTAMS SHALL BE ISSUED BY RPR/FALCON FIELD. UPON COMPLETION OF WORK AND RETURN OF ALL SUCH AREAS TO STANDARD CONDITIONS, THE CONTRACTOR MUST COORDINATE WITH THE RPR AND VERIFY THE CANCELLATION OF ALL NOTICES ISSUED VIA THE NOTAM SYSTEM. THROUGHOUT THE PROJECT DURATION , THE CONTRACTOR MUST:

A. BE AWARE OF AND UNDERSTAND THE SAFETY PROBLEMS AND HAZARDS DESCRIBED IN ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.
B. CONDUCT ACTIVITIES SO AS NOT TO VIOLATE ANY SAFETY STANDARDS CONTAINED IN ADVISORY CIRCULAR 150/5370-2G OR ANY OF THE REFERENCES THEREIN.
C. INSPECT ALL CONSTRUCTION AND STORAGE AREAS AS OFTEN AS NECESSARY TO BE AWARE OF CONDITIONS.
D. PROMPTLY TAKE ALL ACTIONS NECESSARY TO PREVENT OR REMEDY ANY UNSAFE OR POTENTIALLY UNSAFE CONDITIONS AS SOON AS THEY ARE DISCOVERED.
E. THE CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS, PROVISIONS, AND PROCEDURES OUTLINED IN CONSTRUCTION SAFETY PHASING PLAN.

8. NOTIFICATION OF CONSTRUCTION ACTIVITIES (CONTINUED)

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RPR AND AIRPORT OPERATIONS SO THAT NOTAMS CAN BE ISSUED, MAINTAINED, AND CANCELED.

IN AN EVENT OF AN EMERGENCY, CONTRACTOR SHALL NOTIFY THE RPR, AIRPORT OPERATIONS, AND AIRPORT EMERGENCY.

9. INSPECTION REQUIREMENTS

CONTRACTOR SHALL COMPLETE A DAILY INSPECTION FOR SAFETY ON THE PROJECT SITE BY COMPLETING THE CHECKLIST PROVIDED IN ADVISORY CIRCULAR 150/5370-2G, APPENDIX D, CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST.

THE CONTRACTOR, RPR AND AIRPORT OPERATIONS MUST PERFORM ONSITE INSPECTIONS THROUGHOUT THE PROJECT, WITH IMMEDIATE REMEDY OF ANY DEFICIENCIES, WHETHER CAUSED BY NEGLIGENCE, OVERSIGHT, OR SCOPE CHANGE.

CONTRACTOR SHALL COMPLETE A FINAL INSPECTION FOR SAFETY ON THE PROJECT SITE AT THE END OF EACH PHASE.

10. APPROACH CLEARANCE TO RUNWAYS

RUNWAY THRESHOLDS MUST PROVIDE AN UNOBSTRUCTED APPROACH SURFACE OVER EQUIPMENT AND MATERIALS. (REFER TO CHAPTER 3 IN ADVISORY CIRCULAR 150/5300-13A, AIRPORT DESIGN, FOR GUIDANCE.

11. RUNWAY AND TAXIWAY VISUAL AIDS

FLASHER BARRICADES, ARE TO BE PLACED AS DETAILED IN THE PLANS AND IN ALL DESIGNATED AREAS AS SHOWN ON THE CONSTRUCTION SAFETY DRAWINGS.

APPROVED FLASHER BARRICADES SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR.

CONTRACTOR TO COVER ALL TAXIWAY EDGE LIGHTS, TAXIWAY SIGNS, RUNWAY SIGNS, AND APRON EDGE LIGHTS FOR AREAS CLOSED BY NOTAM TO THE APPROVAL OF THE RPR.

12. MARKING AND SIGNS FOR ACCESS ROUTES

ALL REQUIRED SIGNS AND MARKINGS SHALL CONFORM TO ADVISORY CIRCULAR 150/5340-18G, STANDARD FOR AIRPORT SIGN SYSTEMS, OR THE FEDERAL HIGHWAY ADMINISTRATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL SIGNS ADJACENT TO AREAS USED BY AIRCRAFT MUST COMPLY WITH THE FRANGIBLE REQUIREMENTS AS STATED IN ADVISORY CIRCULAR 150/5220-23A, FRANGIBLE CONNECTIONS.

13. HAZARD MARKINGS AND LIGHTING

PRIOR TO CLOSING ANY AREAS IN THE AOA TO AIRCRAFT OR EMERGENCY TRAFFIC, CONTRACTOR MUST CLEARLY DEFINE CLOSED AREAS WITH WARNING LIGHTS, BARRICADES, CLOSED 'X' MARKINGS, RCMS, AND FLAGS TO THE APPROVAL OF THE RPR. CONTRACTOR TO REFER TO CONSTRUCTION SAFETY DRAWINGS.

HAZARDOUS AREAS ON THE MOVEMENT AREA WILL BE MARKED WITH FLASHER BARRICADES. THESE BARRICADES RESTRICT ACCESS AND MAKE HAZARDS OBVIOUS TO AIRCRAFT, PERSONNEL, AND VEHICLES. DURING PERIODS OF LOW VISIBILITY AND AT NIGHT, IDENTIFY HAZARDOUS AREAS WITH RED FLASHING LIGHTS.

OPEN TRENCHES AND EXCAVATIONS MUST BE PROMINENTLY MARKED WITH RED OR ORANGE FLAGS AND LIGHTS AS APPROVED BY THE RPR.

14. PROTECTION OF RUNWAY AND TAXIWAY AREAS

SAFETY AREAS - CONTRACTOR SHALL NOT IMPEDE ON THE SAFETY AREAS WITHOUT A CLOSURE OF THE RUNWAY/TAXIWAY BY MEANS OF A NOTAM.

OBJECT FREE AREAS - CONTRACTOR SHALL NOT PLACE EQUIPMENT, MATERIAL, OR STOCKPILES IN THIS AREA. ALL OBJECTS OR MATERIALS ADJACENT TO THIS AREA SHALL BE PROPERLY MARKED/LIT PER ADVISORY CIRCULAR 150/5370-2G. CONTRACTOR CANNOT WORK IN ACTIVE TAXIWAY OBJECT FREE AREA WITHOUT WING WALKERS TO MAINTAIN A 5' CLEARANCE FROM THE WINGSPAN OF THE AIRCRAFT TO CONSTRUCTION EQUIPMENT OR MATERIAL.

OBSTACLE FREE ZONE- CONTRACTOR TO PREVENT PERSONNEL, MATERIAL, AND/OR EQUIPMENT FROM PENETRATING THE OBSTACLE FREE ZONE AS DEFINED IN ADVISORY CIRCULAR 150/5300-13A.

15. AIRPORT SECURITY

CONTRACTOR SHALL ADHERE TO AIRPORT SECURITY REQUIREMENTS AT ALL TIMES. SECURITY IDENTIFICATION BADGES AND RELATED AIRPORT FAMILIARIZATION REQUIREMENTS ARE MANDATORY. KEY CONSTRUCTION SUPERINTENDENTS AND ANY OTHER PERSONNEL DEEMED NECESSARY BY THE AIRPORT SHALL BE REQUIRED TO BE BADGED BY THE AIRPORT, AT THE EXPENSE OF THE CONTRACTOR PRIOR TO CONSTRUCTION. UNBADGED CONSTRUCTION PERSONNEL SHALL BE ESCORTED AT ALL TIMES DURING AIRSIDE CONSTRUCTION.

16. OTHER LIMITATIONS ON CONSTRUCTION

PROHIBITING OPEN-FLAME WELDING OR TORCH CUTTING OPERATIONS UNLESS ADEQUATE FIRE SAFETY PRECAUTIONS ARE PROVIDED AND THESE OPERATIONS HAVE BEEN AUTHORIZED BY THE AIRPORT OPERATOR (AS TAILORED TO CONFORM TO LOCAL REQUIREMENTS AND RESTRICTIONS).

PROMINENTLY MARKING OPEN TRENCHES, EXCAVATIONS, AND STOCKPILED MATERIALS AT THE CONSTRUCTION AND LIGHTING THESE OBSTACLES DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS.

MARKING AND LIGHTING CLOSED, DECEPTIVE, AND HAZARDOUS AREAS ON AIRPORTS, AS APPROPRIATE. CONSTRAINING STOCKPILED MATERIAL TO PREVENT ITS MOVEMENT AS A RESULT OF THE MAXIMUM ANTICIPATED AIRCRAFT BLAST AND FORECAST WIND CONDITIONS.

NO USE OF TALL EQUIPMENTS (CRANES, CONCRETE PUMPS, AND SO ON) UNLESS A FAA 7460-1 DETERMINATION LETTER IS ISSUED FOR SUCH EQUIPMENT.

NO USE OF ELECTRICAL BLASTING CAPS ON OR WITHIN 1,000' OF THE AIRPORT PROPERTY.

NO USE OF FLARE POTS WITHIN THE AOA.

17. DUST CONTROL

CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST FROM THE CONSTRUCTION SITE AT ALL TIMES. CONTRACTOR SHALL HAVE A WATER TRUCK AND OPERATOR AVAILABLE 24 HOURS A DAY TO CONTROL DUST. THE PROJECT'S LOCATION IS NEAR ACTIVE RUNWAYS AND HIGHWAYS AND IS IN A LOCATION THAT EXPERIENCES HIGH WIND. IT IS CRITICAL FOR THE CONTRACTOR TO KEEP DUST TO AN ABSOLUTE MINIMUM BOTH DURING CONSTRUCTION, AND AFTER CONSTRUCTION UNTIL THE EXPOSED SURFACES CONTAIN SUSTAINABLE VEGETATION. CONTRACTOR SHALL PROVIDE THE RPR AND AIRPORT OPERATIONS WITH A CONTACT FOR 24 HOUR DUST CONTROL.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY PLAN SAFETY NOTES

DRAWING G051

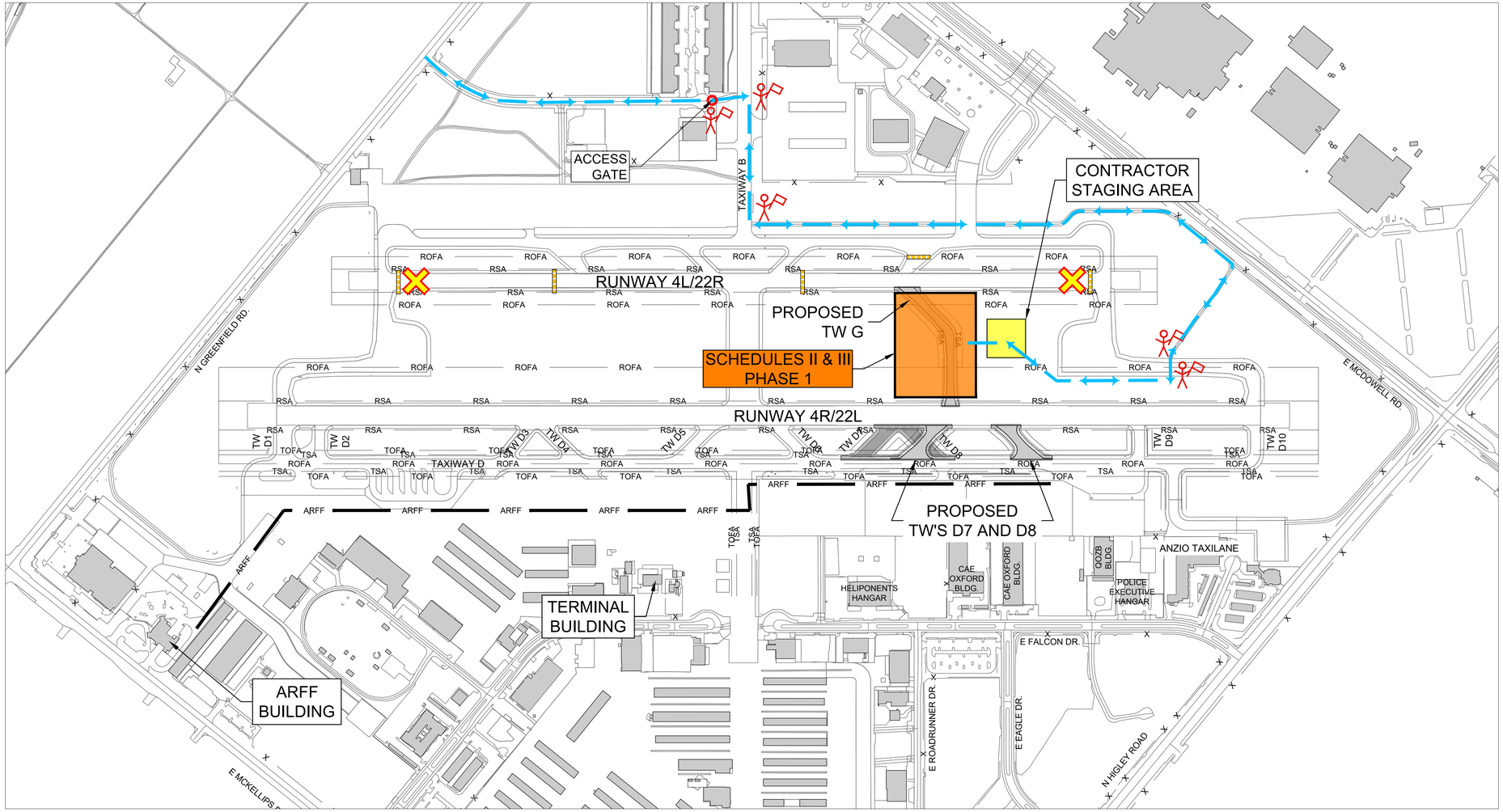
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 9 OF 52

CATALOG NUMBER: A-270528

DATE SAVED: 2/25/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G051-SAFE.DWG



CONSTRUCTION PHASING NOTES

SCHEDULES II & III / PHASE 1

DURATION

65 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

ACCESS TO APPROVED WORK AREAS SHALL BE FROM 6PM TO 6AM.

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

ELECTRICAL
1. ALCMS INSTALLATION

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE II PHASE 1 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE II PHASE 2.
21. ALL WORK FOR SCHEDULE II, PHASE 1 SHALL BE COMPLETED AT NIGHT. ALL NECESSARY LIGHT PLANTS AND OTHER ADDITIONAL SAFETY PRECAUTIONS SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.
22. THE WORK AREA SHALL NOT EXTEND CLOSER TO RUNWAY 4R/22L THAN 80 FEET FROM THE CENTERLINE OF THE RUNWAY, AND CLOSER TO RUNWAY 4L-22R THAN 65 FEET FROM THE CENTERLINE OF THE RUNWAY. THE CONTRACTOR SHALL PLACE STAKES OR OTHER HIGHLY VISIBLE MARKERS APPROVED BY THE RPR/FALCON FIELD AT THE PHASE LIMITS DENOTING THESE AREA, SPACED 5 FEET ON CENTER FOR THE FULL LENGTH OF THE PHASE LIMITS.
23. NO STOCKPILES OR EQUIPMENT SHALL BE LEFT IN THE RUNWAY OBJECT FREE AREA OF EITHER RUNWAY OUTSIDE WORKING HOURS.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS Date Signed 3/29/23 ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING
SCHEDULE II, PHASE 1

DRAWING G052

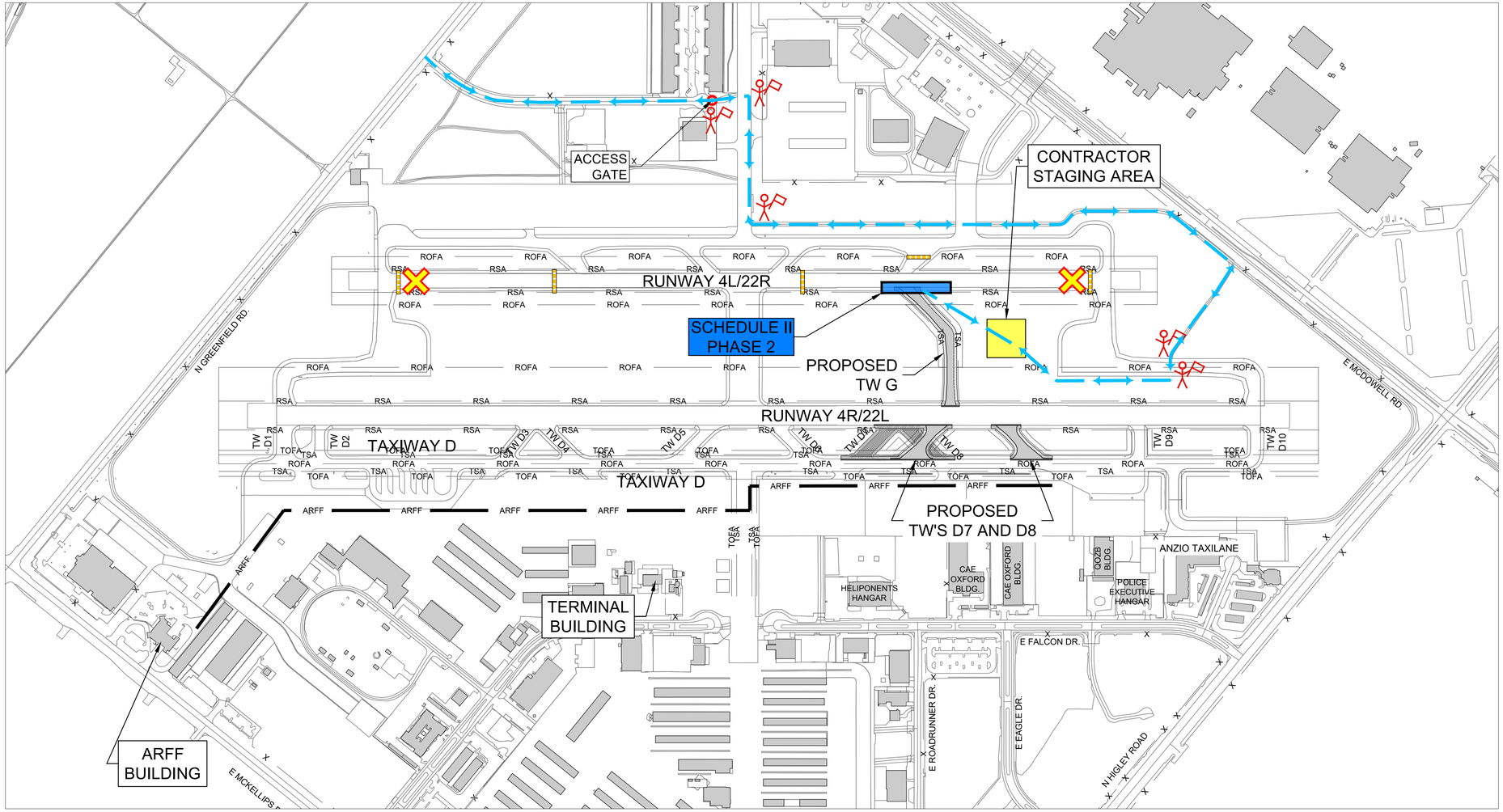
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 10 OF 52

CATALOG NUMBER: A-270529

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G052-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

CONSTRUCTION PHASING NOTES

SCHEDULE II / PHASE 2

DURATION

10 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

24 HOUR ACCESS TO APPROVED WORK AREAS

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- RUNWAY 4L/22R WILL BE CLOSED TO AIRCRAFT OPERATIONS

SCHEDULE II PHASE 2 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE II PHASE 1

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. INSTALL BARRICADES/COVER SIGNS
2. EROSION CONTROL MEASURES
3. PARTIAL DEPTH PAVEMENT REMOVAL

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
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18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE II PHASE 2 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE II PHASE 1.

GRAPHIC SCALE
300 0 300 600
(IN FEET)
1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING SCHEDULE II, PHASE 2

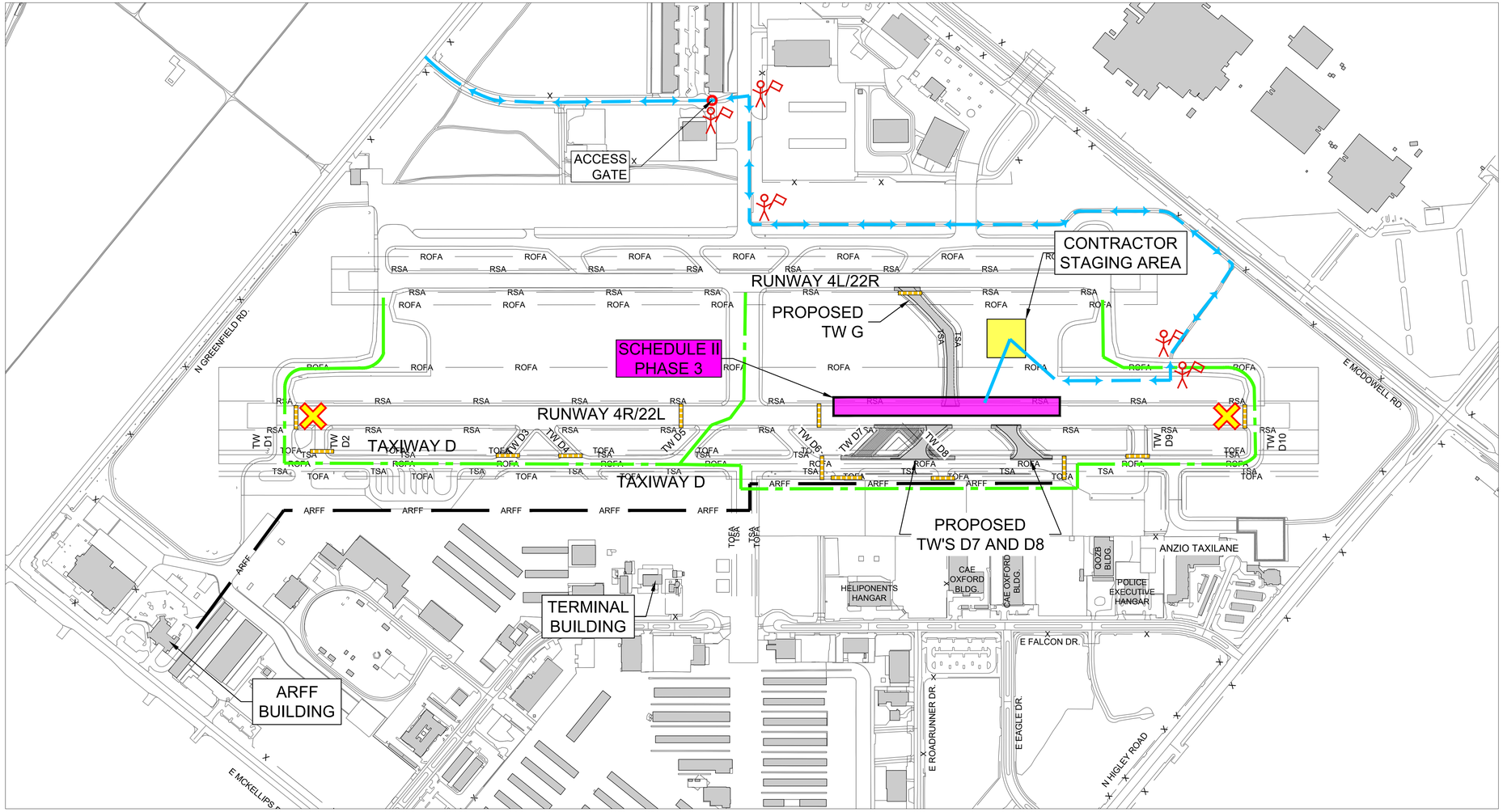
DRAWING G053

SHEET 11 OF 52

CATALOG NUMBER: A-270530

L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G053-PHAS.DWG

DATE SAVED: 3/29/23



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRCRAFT ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

CONSTRUCTION PHASING NOTES

SCHEDULE II / PHASE 3

DURATION

12 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

24 HOUR ACCESS TO APPROVED WORK AREAS

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE II PHASE 3 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASES 4, 5, AND 6.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING
SCHEDULE II, PHASE 3

DRAWING G054

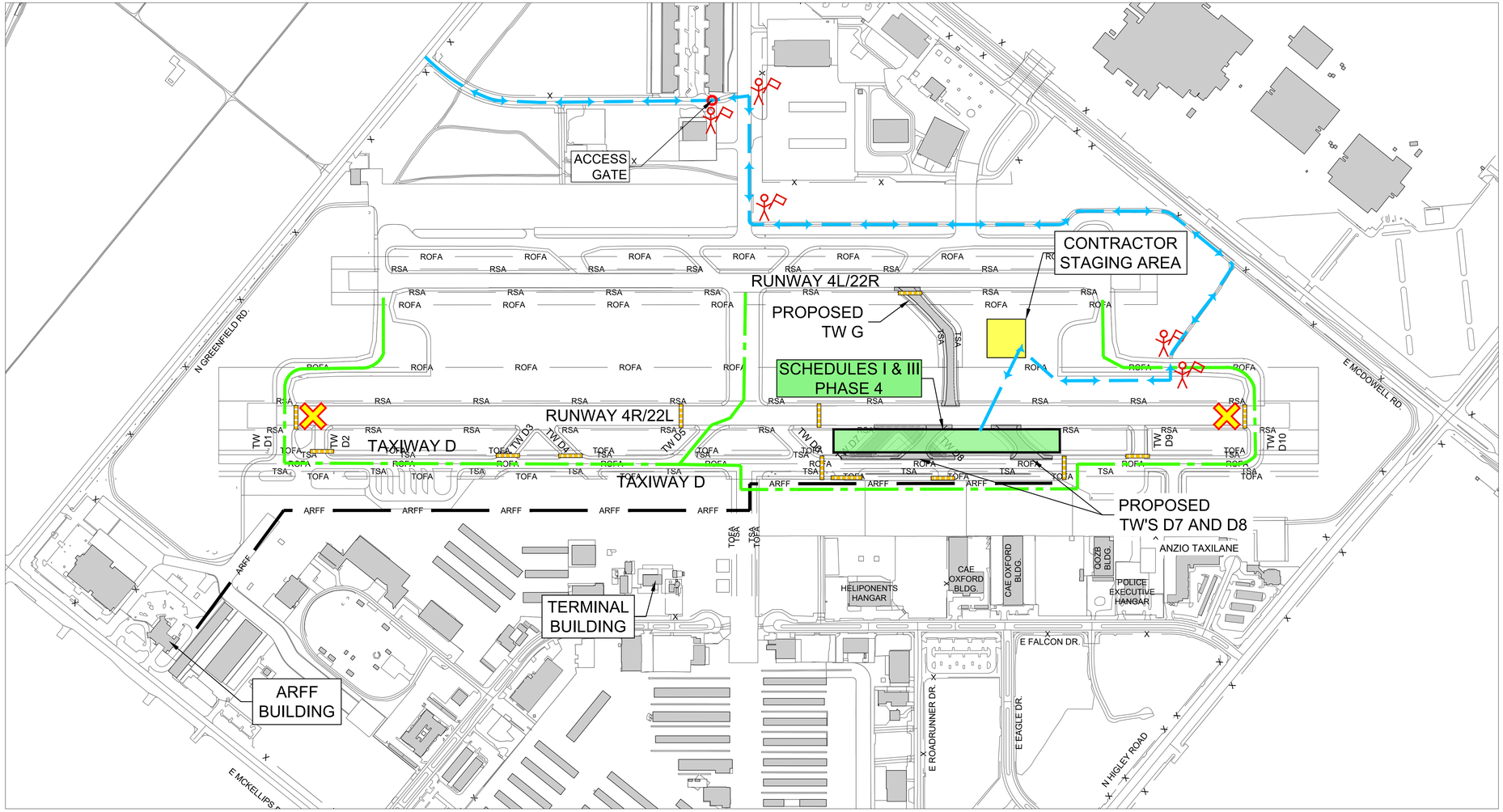
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 12 OF 52

CATALOG NUMBER: A-270531

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G054-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS

CONSTRUCTION PHASING NOTES

SCHEDULES I & III / PHASE 4

DURATION

102 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

ACCESS TO APPROVED WORK AREAS SHALL BE FROM 6PM TO 6AM.

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

ELECTRICAL
1. ALCMS INSTALLATION

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE I PHASE 4 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASES 5 AND 6.
21. ALL WORK DURING PHASE 4 THAT IS NOT CONCURRENT WITH SCHEDULE I PHASES 5 SHALL BE COMPLETED AT NIGHT DURING THE SPECIFIED HOURS. NO EQUIPMENT OR STOCKPILES SHALL BE LEFT IN THE PHASE 3 WORK AREA.
22. THE WORK AREA SHALL NOT EXTEND CLOSER TO RUNWAY 4R/22L THAN 80 FEET FROM THE CENTERLINE OF THE RUNWAY, AND CLOSER TO TAXIWAY D THAN 60 FEET FROM THE CENTERLINE OF THE TAXIWAY. THE CONTRACTOR SHALL PLACE STAKES OR OTHER HIGHLY VISIBLE MARKERS APPROVED BY THE RPR/FALCON FIELD AT THE PHASE LIMITS DENOTING THESE AREA, SPACED 5 FEET ON CENTER FOR THE FULL LENGTH OF THE PHASE LIMITS.
21. ALL WORK FOR SCHEDULE I, PHASE 4 SHALL BE COMPLETED AT NIGHT. ALL NECESSARY LIGHT PLANTS AND OTHER ADDITIONAL SAFETY PRECAUTIONS SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 6924 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING
SCHEDULE I, PHASE 4

DRAWING G055

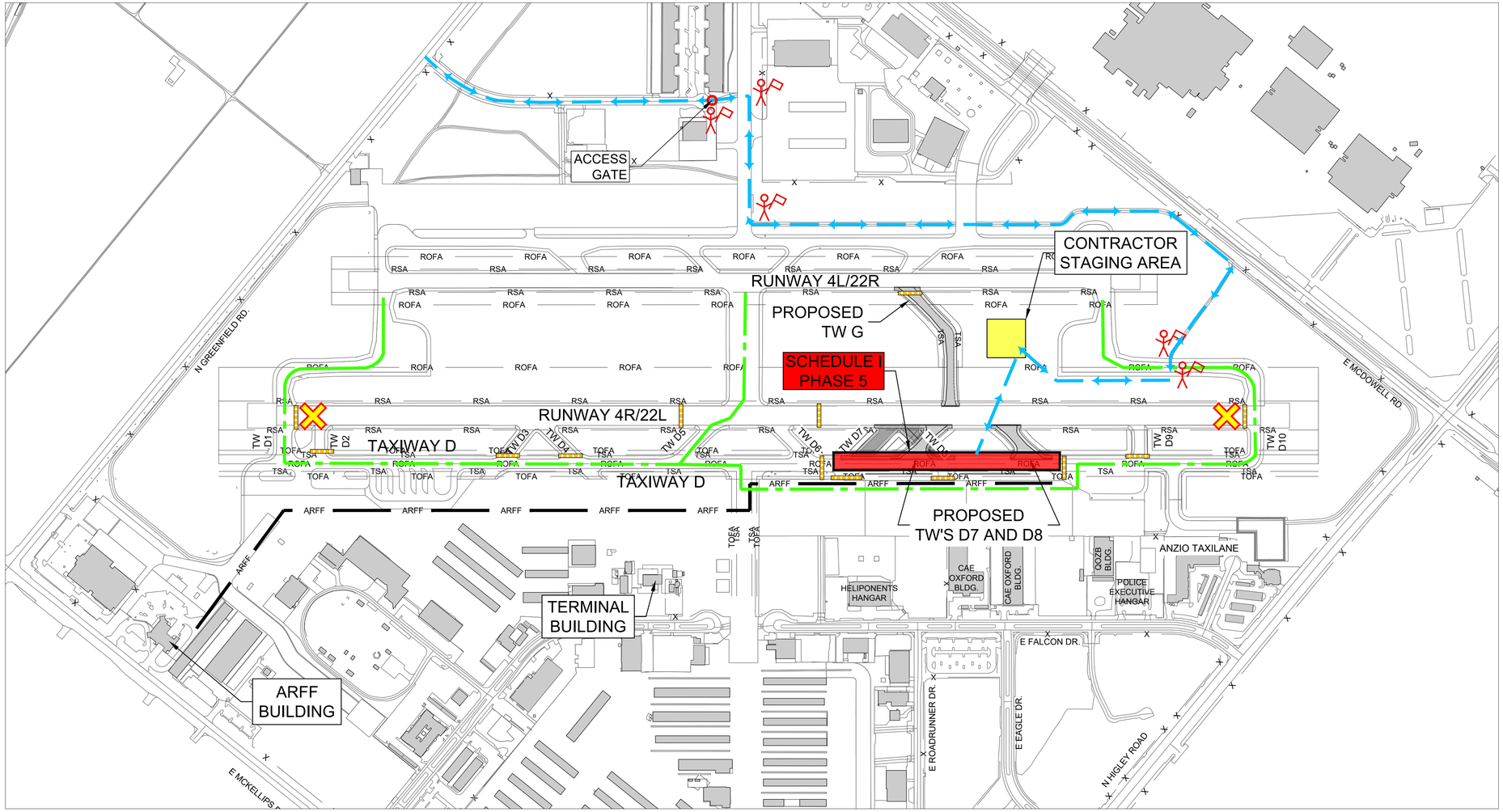
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 13 OF 52

CATALOG NUMBER: A-270532

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G055-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRCRAFT ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS

CONSTRUCTION PHASING NOTES

SCHEDULE I / PHASE 5

DURATION

27 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

ACCESS TO APPROVED WORK AREAS SHALL BE FROM 6PM TO 6AM.

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE I PHASE 5 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASE 6 AND SCHEDULE II PHASE 3.
21. ALL WORK FOR SCHEDULE I, PHASE 5 SHALL BE COMPLETED AT NIGHT. ALL NECESSARY LIGHT PLANTS AND OTHER ADDITIONAL SAFETY PRECAUTIONS SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69241 JON BRYCE WEEKS Date Signed 3/29/23 ARIZONA, U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

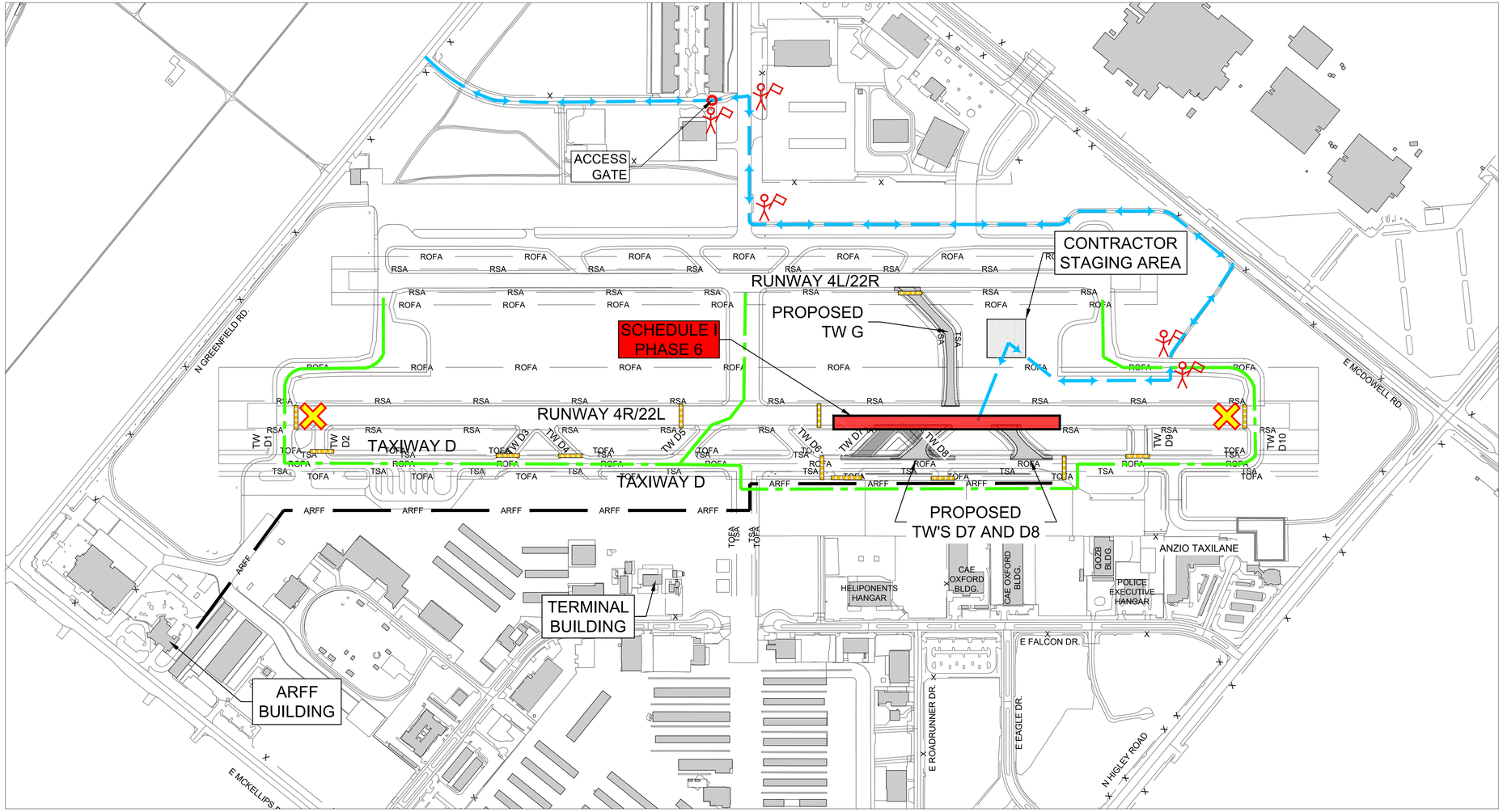
CONSTRUCTION SAFETY DRAWING
SCHEDULE I, PHASE 5

DRAWING G056

SHEET 14 OF 52

CATALOG NUMBER: A-270533

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G056-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRCRAFT ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

CONSTRUCTION PHASING NOTES

SCHEDULE I / PHASE 6

DURATION

12 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

24 HOUR ACCESS TO APPROVED WORK AREAS

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
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18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE I PHASE 6 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASE 5 AND SCHEDULE II PHASE 3.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer — CERTIFICATE — 59247 — JON BRYCE WEEKS — 3/06/23 — Date Signed — ARIZONA, U.S.A. — CIVIL

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING
SCHEDULE I PHASE 6

DRAWING G057

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 15 OF 52

CATALOG NUMBER: A-270534

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G057-PHAS.DWG

U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: Painting, Marking, and Lighting of Vehicles Used on an Airport	**Date:** April 1, 2010	**AC No:** AC 150/5210-5D
	Initiated by: AAS-100	**Change:**

1. PURPOSE. This advisory circular (AC) provides guidance, specifications, and standards for painting, marking, and lighting of vehicles operating in the airport air operations area (AOA). The approved lights, colors, and markings herein assure the conspicuity of vehicles operating in the AOA from both the ground and the air.

2. CANCELLATION. This AC cancels AC 150/5210-5C, Painting, Marking, and Lighting of Vehicles Used on an Airport, dated August 31, 2007.

3. APPLICATION. The Federal Aviation Administration (FAA) recommends the guidelines and standards in this Advisory Circular for vehicles operating in the airport AOA. In general, use of this AC is not mandatory. ***However***, use of this AC is mandatory for vehicles funded with federal grant monies through the Airport Improvement Program (AIP) and/or with revenue from the Passenger Facility Charges (PFC) Program. See Grant Assurance No. 34, "Policies, Standards, and Specifications," and PFC Assurance No. 9, "Standard and Specifications."

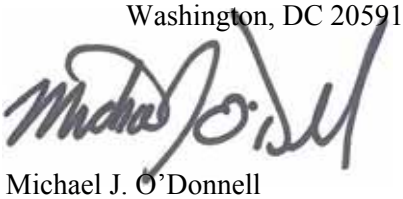
Vehicles covered by this AC that do not meet this standard may be used until the vehicle is repainted or replaced, but no later than **December 31, 2010.**

4. PRINCIPAL CHANGES. This AC contains new specifications and recommendations for the painting, marking, and lighting of Towbarless Tow Vehicles (TLTVs).

5. METRIC UNITS. To promote an orderly transition to metric units, this AC includes both English and metric dimensions. The metric conversions may not be exact equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

6. COMMENTS OR SUGGESTIONS for improvements to this AC should be sent to:

Manager, Airport Engineering Division
Federal Aviation Administration
ATTN: AAS-100
800 Independence Avenue, S.W.
Washington, DC 20591



Michael J. O'Donnell
Director of Airport Safety and Standards

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PAINTING, MARKING, AND LIGHTING OF VEHICLES USED ON AN AIRPORT

1. SOURCES OF APPLICABLE DOCUMENTS.

a. American National Standards Institute, Inc. (ANSI), 25 West 43rd St. 4th Floor, New York, NY 10036. Website: **www.ansi.org**

b. American Society for Testing & Materials (ASTM), ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. Website: **www.astm.org**

c. The National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, Massachusetts 02169-7471. Website: **www.nfpa.org**

d. The U. S. General Services Administration (GSA), Centralized Mailing List Services, 501 West Felix Street, Whse 9, South End P.O. Box 6477, Fort Worth, Texas 76115-6477. Website: **www.gsa.gov**

e. The Superintendent of Documents, U.S. Government Printing Office, 732 North Capitol St. NW, Washington, DC 20401.

f. Society of Automotive Engineers, Inc. (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001. Website: **www.sae.org**

g. FAA Advisory Circulars: U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Ave., Landover, MD 20785. Website: **www.faa.gov**

h. FAA Engineering Briefs: **www.faa.gov/airports/engineering/engineering_briefs/**

2. DEFINITIONS.

The following definitions apply in this AC:

a. **Vehicle –** All conveyances, except aircraft, used on the ground to transport persons, cargo, equipment or those required to perform maintenance, construction, service, and security duties.

b. **Air Operations Area (AOA) –** The portion of airport that encompasses the landing, take off, taxiing, and parking areas for aircraft.

c. **Airport Emergency Vehicles** – Vehicles that are authorized in the AOA for emergency purposes (e.g., ambulances, aircraft rescue and fire fighting (ARFF) vehicles and emergency response vehicles) as authorized by the airport traffic control tower (ATCT) or an authorized on-site accident/incident commander.

d. **Airport Operations Vehicles –** Vehicles routinely used by airport operations personnel for airport inspection and duties associated with airfield operations (such as airfield condition reporting and Incident Command) on the AOA and Movement Area.

e. **Airport Security Vehicles –** Vehicles that are authorized in the AOA for security purposes, as needed (e.g. police cars).

f. Airfield Service Vehicles – Vehicles that are routinely used in the AOA for airfield service, maintenance, or construction (e.g. snow blowers, snowplows, maintenance trucks, and tractors).

g. Aircraft Support Vehicles – Vehicles that are routinely used in the AOA to support aircraft operations (e.g. aircraft pushback tractors, baggage/cargo tractors or trucks, air conditioning and aviation fuel trucks). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.

h. Reduced Visibility – Prevailing visibility is less than one statute mile (1609 meters) and/or the runway visual range (RVR) is less than 6,000 feet (1830 meters).

i. Movement Area – The runways, taxiways, and other areas of an airport/heliport that are used for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with an operating airport traffic control tower (ATCT), specific approval for entry onto the movement area must be obtained from air traffic control (ATC).

j. Other Vehicles – Vehicles that are not routinely authorized in the AOA (e.g. construction vehicles). These vehicles are typically owned by airlines, vendors, or contractors and are not eligible for Federal funding.

k. Peak Intensity – Peak intensity, for purposes of this document, means the maximum magnitude of luminescence as measured in candela.

l. Towbarless Tow Vehicle (TLTV) – a type of aircraft support vehicle whose main purpose is to tow aircraft in the AOA by way of nose gear capture.

3. VEHICLE PAINTING.

NOTE: *Airport vehicle paint and markings are a safety of flight requirement. The approved colors/markings herein assure conspicuity of vehicles operating in the AOA from both the ground and air.*

a. Airport Emergency Vehicles.

(1) Ambulances. Ambulance vehicles are painted per the most current version of Federal Specification KKK-A-1822, *Federal Specification for the Star-of-Life Ambulance*. Ambulances are not considered vehicles routinely operating on the AOA.

(2) Aircraft Rescue and Fire Fighting (ARFF) Vehicles. Yellowish-green is the vehicle color standard. Color specifications are per Appendix A.

NOTE: *A yellowish-green color provides optimum visibility during all light levels encountered during a 24-hour day and under variations of light that result from weather and seasonal changes.*

b. Airport Operations Vehicles. Airport operations vehicles may be painted in colors designated by the airport operator. The characteristics must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airport Security Vehicles. Comply with specific state or local requirements.

d. Airfield Service Vehicles. Chrome yellow is the vehicle color standard. Color specifications are per Appendix A. When vehicles are equipped with bumper bars 8 inches (200 mm) or more in depth, the bars must be painted in alternate stripes 4 inches (100 mm) in width of chrome yellow and black inclined 45° to the vertical.

e. Aircraft Support Vehicles.

(1) Any color or combination of colors other than yellowish-green or chrome yellow. The bumper bar paint scheme in paragraph 3.d (of alternating chrome yellow and black stripe) is recommended.

(2) TLTVs. International orange is the vehicle color standard. Retroreflective tape covering more than 25 percent of the vehicle's vertical surfaces may be used as a temporary measure to meet this standard prior to scheduled vehicle painting.

f. Other Vehicles. Any color or combination of colors other than solid black or white.

4. VEHICLE MARKING.

a. Airport Emergency Vehicles.

(1) Ambulances. Ambulances are marked per the most current version of Federal Specification KKK-A-1822.

(2) ARFF Vehicles. Emergency rescue and fire fighting vehicles are marked with the letters "ARFF, "Fire," or "Rescue" and in accordance with 4.c.(1)-(5) of this AC.

b. Airport Operations Vehicles. Airport operations vehicles may be marked as designated by the airport operator. Marking must be coordinated with the respective ATCT and identified in the tower letter of agreement.

c. Airfield Service Vehicles and Aircraft Support Vehicles.

(1) Airport operator owned vehicles must display an identification number on each side and on the roof (the hood should be used if the vehicle has no roof).

(2) Side numbers will be a minimum of 16 inches (410 mm) in height and conspicuously located.

(3) Roof numbers will be a minimum of 24 inches (610 mm) in height and affixed with their bases toward the front of the vehicle. The identification numbers should provide sharp color contrast to the vehicle color.

(4) In addition to the identification numbers, airport operator-owned vehicles must display either the name of the airport and/or the airport insignia.

(5) To further improve night-time recognition of vehicles, a minimum 8 inch (200 mm) wide horizontal band of high gloss white paint or white reflective tape (Retroreflective, ASTM-D 4956-09, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Type III & above) must be used around the vehicle's surface. Figures 1, 2, and 3 show suggested locations for the horizontal reflective band.

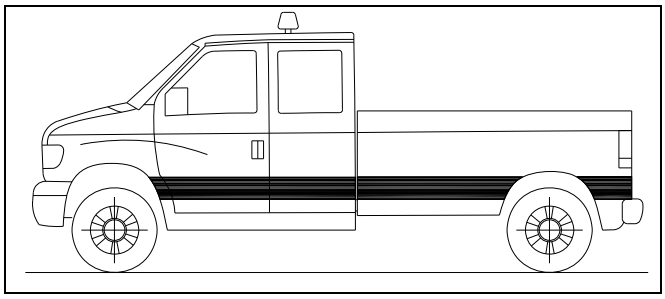


Figure 1: Suggested location for the horizontal reflective band, Option 1

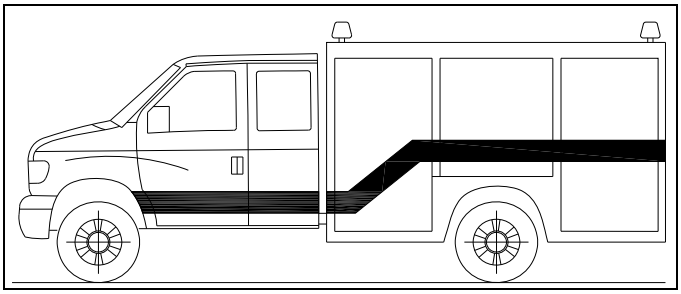


Figure 2: Suggested location for the horizontal reflective band, Option 2

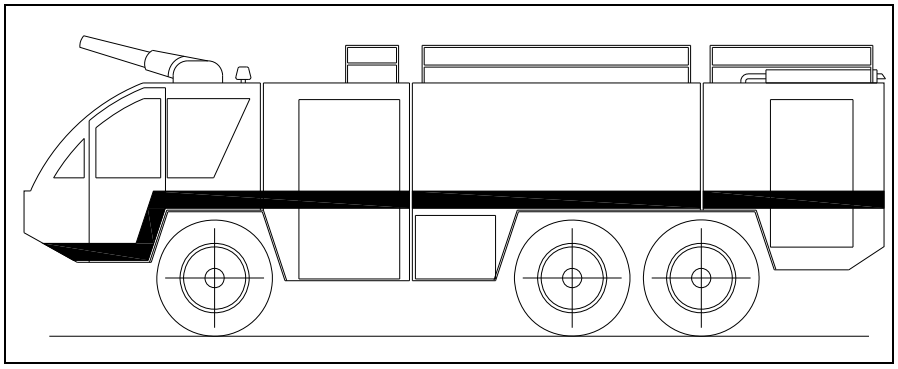


Figure 3: Suggested location for the horizontal reflective band, Option 3

(6) TLTVs. Retroreflective tape is used to outline the shape of a TLTV. If the vertical edge of the vehicle is rounded, the tape should be placed on the rounded portion to reflect light in both the horizontal and vertical planes. Where the placement of the tape may interfere with, or may be worn down by, maintenance or operational activities, tape is not required. Suggested locations for the retroreflective bands are shown in Figure 4.

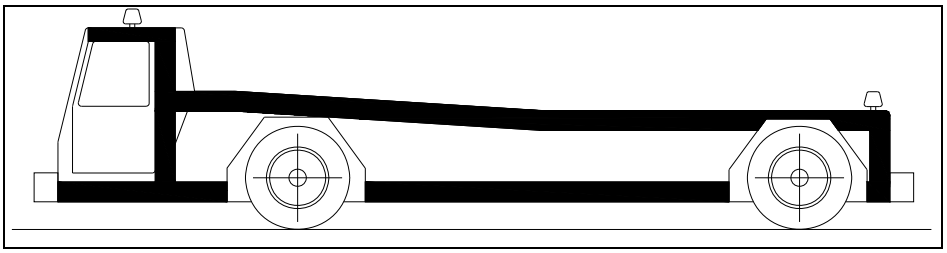


Figure 4: Suggested placement of retroreflective tape on a TLTV

d. Airport Security and Other Vehicles.

(1) Vehicles other than those that routinely traverse any portion of the AOA under the control of ATC, which are not escorted by a vehicle in constant two-way radio communication with ATC and properly equipped and authorized to operate in the AOA, must be provided with a flag on a staff attached to the vehicle so that the flag will be readily visible.

(2) At airports without air traffic control facilities, flags must be provided on all vehicles.

(3) The flag must be at least a 3-foot by 3-foot (0.9 meter by 0.9 meter) square having a checkered pattern of international orange and white squares at least 1 foot (300 mm) on each side (see Appendix A for the fabric color specification).

5. VEHICLE LIGHTING.

a. Airfield Service, Aircraft Support, and Airport Operations Vehicles.

(1) The standard for identification lighting is a yellow flashing light that is mounted on the uppermost part of the vehicle structure. A steady yellow light designates vehicles limited to non-movement areas.

(2) The light must be visible from any direction, day and night, including from the air.

(3) Color specifications for vehicle identification lights are per Appendix B.

(4) TLTVs. An LED light bar placed above the operator's cab may be used in place of the rotating yellow flashing light. In addition, a yellow flashing light (of any type) must be installed on the upper left-rear and right-rear corners of the TLTV, and must be activated when an aircraft is in tow. The size of the rear flashing lights must be large enough to meet the requirements of Section 5.c, but not so large as to interfere with the normal or towing operations of the TLTV.

b. Airport Emergency, Security, and Other Vehicles, which are not escorted by a properly lighted vehicle, must be identified during periods of low visibility by a light.

c. Characteristics of Flashing Lights:

(1) Ambulance lights must meet the specifications in the most current version of Federal Specification KKK-A-1822, and ARFF vehicles must meet NFPA, state, and local requirements.

(2) Lights must have peak intensity within the range of 40 to 400 candelas (effective) from 0^{o} (horizontal) up to 10^{o} above the horizontal and for 360^{o} horizontally. The upper limit of 400 candelas (effective) is necessary to avoid damage to night vision.

(3) From 10^{o} to 15^{o} above the horizontal plane, the light output must be $1/10^{th}$ of peak intensity or between 4 and 40 candelas (effective).

(4) Lights must flash at 75 ± 15 flashes per minute.

NOTES:

1. The effective intensity of a flashing light is equal to the intensity of a steady-burning (fixed) light of the same color that produces the same visual range under identical conditions of observation.

2. If xenon flashtubes are used, refer to AC 150/5345-43, Specification for Obstruction Lighting Equipment, for guidance concerning methods of calculating effective intensity.

d. Light Colors.

(1) Airport Emergency Vehicles.

(a) **Ambulances.** Per the most current version of Federal Specification KKK-A-1822.

(b) **ARFF Vehicles.** Red or a combination of red-and-white flashing lights per the chromaticity requirements in Appendix B.

(2) Airport Security Vehicles. Signal blue or a combination of red and signal blue flashing light per the chromaticity requirements in Appendix B.

(3) Airfield Service, Aircraft Support, Airport Operations, and Other Vehicles. Yellow flashing light per the chromaticity requirements in Appendix B.

APPENDIX A. COLOR SPECIFICATIONS

A-1. SPECIFICATIONS. Colors specified in Table A-1 are per the Commission Internationale de l'Eclairage (CIE) L*a*b* system of color specification. For a description of this system, refer to American Society for Testing & Materials (ASTM) D 2244, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.*

Table A-1. Specification for vehicle and flag colors

Standard Illuminant D65 **Usage**	**Chrome Yellow**			**Yellowish-Green**			**International Orange**		
	Vehicle Paint			**Vehicle Paint**			**Vehicle Paint / Flag Fabric**		
CIELAB DATA	**L***	**a***	**b***	**L***	**a***	**b***	**L***	**a***	**b***
Centroid Color	72.8	24.4	77.6	78.3	-10.2	80.4	45.0	53.5	52.0
Point 1	72.8	31.8	82.9	78.3	-9.0	92.0	45.0	61.4	47.8
Point 2	72.8	25.5	66.7	78.3	-7.6	73.2	45.0	53.9	41.4
Point 3	72.8	18.0	69.3	78.3	-11.0	69.3	45.0	53.5	53.4
Point 4	72.8	22.4	86.0	78.3	-13.4	86.2	45.0	49.7	60.4
Light Limit	77.8			83.3			49.9		
Dark Limit	67.8			73.3			41.6		
Max ΔE	11.1			11.7			10.7		

A-2. COLOR TESTS. Acceptable colors are those that meet the gloss rating test and either a visual or an instrumental color test as follows:

NOTE: *Flag fabric colors must meet either the instrumental tests in Table A-1 or the visual method described in paragraph A-2b(1).*

a. Gloss Rating Test. This test is performed per ASTM D 523, *Standard Test Method for Specular Gloss,* on a paint sample of the color to be applied on the vehicle. An acceptable color sample is high gloss with a minimum gloss rating of 70 units, for 60° geometry.

b. Color Test Methods:

(1) Visual. Prepare a master specimen of the color (per Table A-1) and gloss (per paragraph A-2a). This specimen will be the master color and be used as the basis of comparison per ASTM D 5531-05, *Standard Guide for the Preparation, Maintenance, and Distribution of Physical Product Standards for Color and Geometric Appearance of Coatings.* To verify the paint color of a vehicle visually, vehicle paint samples must be

prepared and viewed per ASTM D 1729-96 (Reapproved 2009), *Standard Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials.*

(2) Instrumental. This test requires a test specimen sample and reference to Table A-1. All test specimen measurements should be conducted per ASTM E 1164-09a *Standard Practice for Obtaining Spectrometric Data for Object-Color Evaluation.* Test specimen tolerances must be per Table A-1 per the following:

(a) Plot the centroid color using the a* and b* CIELAB coordinate data from Table A-1 on graph paper or by entry of the coordinate data into a computer program. Plot and connect points 1 through 4 from the same table to form a quadrilateral; noting that the centroid color is within this figure. See Figure A-1 for plots of all three color specifications in Table A-1.

(b) Perform color sample measurements per ASTM E 1164-09a. If necessary, convert measurements to CIELAB L*, a*, and b* color space. See ASTM E 308-08, *Standard Practice for Computing the Colors of Objects by Using the CIE System,* for color space conversion formulae.

(c) An acceptable color is one that meets:

(i) the chromaticity requirements of the color samples a* and b* CIELAB coordinate data by falling within the quadrilateral;

(ii) the L* data lightness requirement by falling within the range defined by the light and dark data of Table A-1;

(iii) the total color difference (ΔE) by not exceeding the limits in Table A-1 when the CIELAB data are computed in the following formula:

$$\Delta E = (\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2})^{\frac{1}{2}}$$

where ΔL*, Δa*, and Δb* values are the differences between those values for the centroid color in Table A-1 and those of the color sample measurements.

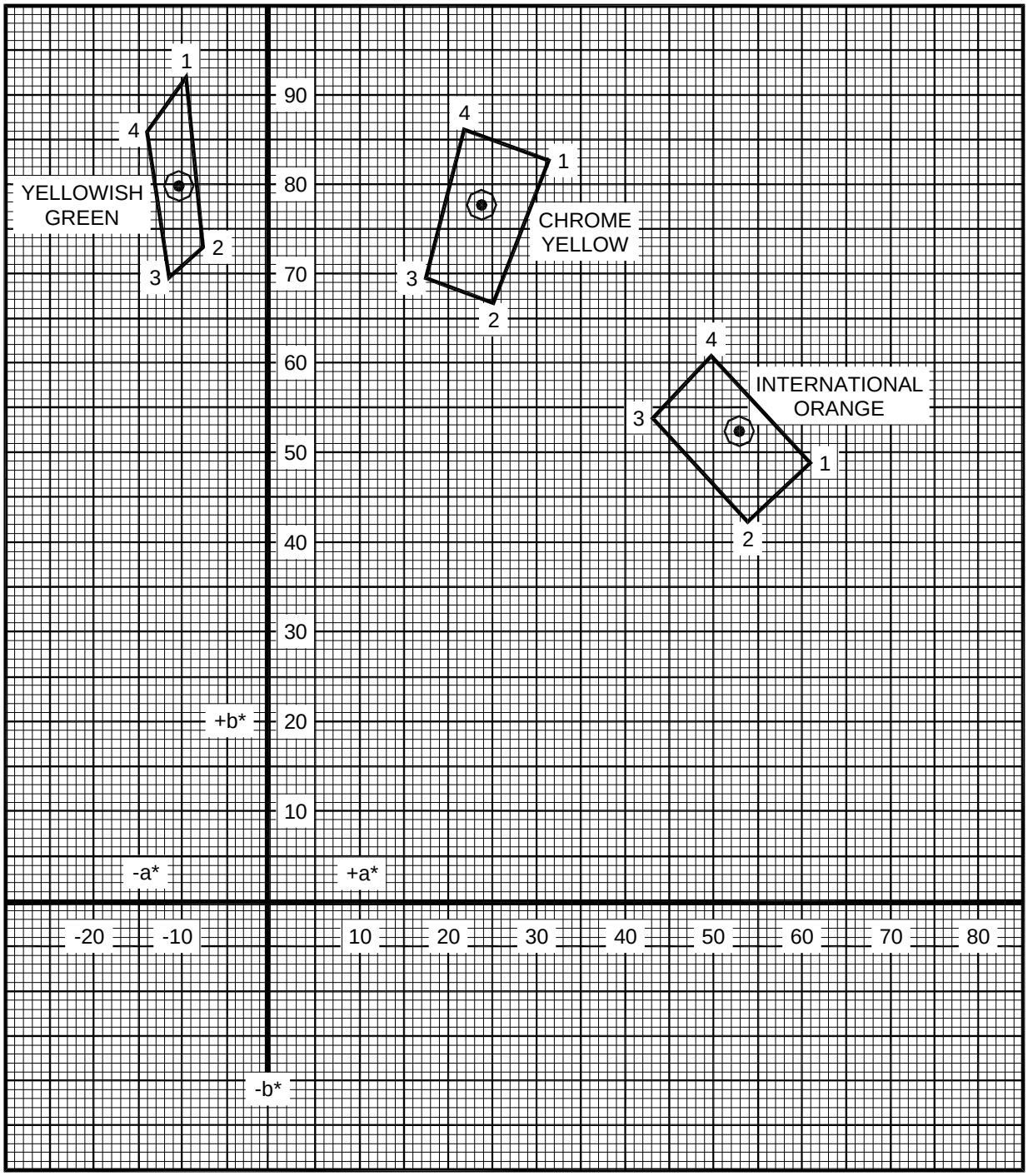


Figure A-1. Plot of selected color paint specifications

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APPENDIX B. COLOR SPECIFICATIONS FOR VEHICLE IDENTIFICATION LIGHTS

B-1. SPECIFICATIONS. The Society of Automotive Engineers (SAE) Standard J578 Revised December 2006, *Color Specification*, defines the acceptable color boundary limits and measurement of emitted red, white, signal blue, and yellow light for vehicle lights. This standard applies to the overall emitted color of light from the device in lieu of emitted light from any small area of the lens. The color of emitted light must fall within the color boundaries per SAE J578 Revised December 2006 (color boundary equations are in the standard) using color measurement methods detailed in the standard. See FAA Engineering Brief #67, Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures, for additional information and Alternative Lighting Devices.

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U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Operational Safety on Airports During Construction	**Date:** 12/13/2017 **Initiated By:** AAS-100	**AC No:** 150/5370-2G **Change:**

1 **Purpose.**

This AC sets forth guidelines for operational safety on airports during construction.

2 **Cancellation.**

This AC cancels AC 150/5370-2F, *Operational Safety on Airports during Construction*, dated September 29, 2011.

3 **Application.**

This AC assists airport operators in complying with Title 14 Code of Federal Regulations (CFR) Part 139, *Certification of Airports*. For those certificated airports, this AC provides one way, but not the only way, of meeting those requirements. The use of this AC is mandatory for those airport construction projects receiving funds under the Airport Improvement Program (AIP). See Grant Assurance No. 34, *Policies, Standards, and Specifications*. While we do not require non-certificated airports without grant agreements or airports using Passenger Facility Charge (PFC) Program funds for construction projects to adhere to these guidelines, we recommend that they do so to help these airports maintain operational safety during construction.

4 **Related Documents.**

ACs and Orders referenced in the text of this AC do not include a revision letter, as they refer to the latest version. Appendix A contains a list of reading material on airport construction, design, and potential safety hazards during construction, as well as instructions for obtaining these documents.

5 **Principal Changes.**

The AC incorporates the following principal changes:

1. Notification about impacts to both airport owned and FAA-owned NAVAIDs was added. See paragraph 2.13.5.3, NAVAIDs.

2. Guidance for the use of orange construction signs was added. See paragraph 2.18.4.2, Temporary Signs.
3. Open trenches or excavations may be permitted in the taxiway safety area while the taxiway is open to aircraft operations, subject to restrictions. See paragraph 2.22.3.4, Excavations.
4. Guidance for temporary shortened runways and displaced thresholds has been enhanced. See Figure 2-1 and Figure 2-2.
5. Figures have been improved and a new Appendix F on the placement of orange construction signs has been added.

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the "ALT" and " ←" keys simultaneously.

Figures in this document are schematic representations and are not to scale.

6 **Use of Metrics.**

Throughout this AC, U.S. customary units are used followed with "soft" (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at http://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at http://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.

John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. PLANNING AN AIRFIELD CONSTRUCTION PROJECT

1.1 Overview.

Airports are complex environments, and procedures and conditions associated with construction activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. The airport operator must understand how construction activities and aircraft operations affect one another to be able to develop an effective plan to complete the project. While the guidance in this AC is primarily used for construction operations, the concepts, methods and procedures described may also enhance the day-to-day airport maintenance operations, such as lighting maintenance and snow removal operations.

1.2 Plan for Safety.

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the airport operator must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities, and associated costs will be identified and their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project, and/or to airport operations to maintain operational safety. This planning effort will ultimately result in a project Construction Safety and Phasing Plan (CSPP). The development of the CSPP takes place through the following five steps:

1.2.1 Identify Affected Areas.

The airport operator must determine the geographic areas on the airport affected by the construction project. Some, such as a runway extension, will be defined by the project. Others may be variable, such as the location of haul routes and material stockpiles.

1.2.2 Describe Current Operations.

Identify the normal airport operations in each affected area for each phase of the project. This becomes the baseline from which the impact on operations by construction activities can be measured. This should include a narrative of the typical users and aircraft operating within the affected areas. It should also include information related to airport operations: the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) of the airplanes that operate on each runway; the ADG and Taxiway Design Group (TDG)[1] for each affected taxiway; designated approach visibility minimums;

[1] Find Taxiway Design Group information in AC 150/5300-13, *Airport Design.*

available approach and departure procedures; most demanding aircraft; declared distances; available air traffic control services; airport Surface Movement Guidance and Control System (SMGCS) plan; and others. The applicable seasons, days and times for certain operations should also be identified as applicable.

1.2.3 Allow for Temporary Changes to Operations.

To the extent practical, current airport operations should be maintained during the construction. In consultation with airport users, Aircraft Rescue and Fire Fighting (ARFF) personnel, and FAA Air Traffic Organization (ATO) personnel, the airport operator should identify and prioritize the airport's most important operations. The construction activities should be planned, through project phasing if necessary, to safely accommodate these operations. When the construction activities cannot be adjusted to safely maintain current operations, regardless of their importance, then the operations must be revised accordingly. Allowable changes include temporary revisions to approach procedures, restricting certain aircraft to specific runways and taxiways, suspension of certain operations, decreased weights for some aircraft due to shortened runways, and other changes. An example of a table showing temporary operations versus current operations is shown in Appendix E.

1.2.4 Take Required Measures to Revise Operations.

Once the level and type of aircraft operations to be maintained are identified, the airport operator must determine the measures required to safely conduct the planned operations during the construction. These measures will result in associated costs, which can be broadly interpreted to include not only direct construction costs, but also loss of revenue from impacted operations. Analysis of costs may indicate a need to reevaluate allowable changes to operations. As aircraft operations and allowable changes will vary widely among airports, this AC presents general guidance on those subjects.

1.2.5 Manage Safety Risk.

The FAA is committed to incorporating proactive safety risk management (SRM) tools into its decision-making processes. FAA Order 5200.11, *FAA Airports (ARP) Safety Management System (SMS)*, requires the FAA to conduct a Safety Assessment for certain triggering actions. Certain airport projects may require the airport operator to provide a Project Proposal Summary to help the FAA determine whether a Safety Assessment is required prior to FAA approval of the CSPP. The airport operator must coordinate with the appropriate FAA Airports Regional or District Office early in the development of the CSPP to determine the need for a Safety Risk Assessment. If the FAA requires an assessment, the airport operator must at a minimum:

1. Notify the appropriate FAA Airports Regional or District Office during the project "scope development" phase of any project requiring a CSPP.
2. Provide documents identified by the FAA as necessary to conduct SRM.
3. Participate in the SRM process for airport projects.
4. Provide a representative to participate on the SRM panel.

5. Ensure that all applicable SRM identified risks elements are recorded and mitigated within the CSPP.

1.3 **Develop a Construction Safety and Phasing Plan (CSPP).**

Development of an effective CSPP will require familiarity with many other documents referenced throughout this AC. See Appendix A for a list of related reading material.

1.3.1 List Requirements.

A CSPP must be developed for each on-airfield construction project funded by the Airport Improvement Program (AIP) or located on an airport certificated under Part 139. For on-airfield construction projects at Part 139 airports funded without AIP funds, the preparation of a CSPP represents an acceptable method the certificate holder may use to meet Part 139 requirements during airfield construction activity. As per FAA Order 5200.11, projects that require Safety Assessments do not include construction, rehabilitation, or change of any facility that is entirely outside the air operations area, does not involve any expansion of the facility envelope and does not involve construction equipment, haul routes or placement of material in locations that require access to the air operations area, increase the facility envelope, or impact line-of-sight. Such facilities may include passenger terminals and parking or other structures. However, extraordinary circumstances may trigger the need for a Safety Assessment and a CSPP. The CSPP is subject to subsequent review and approval under the FAA's Safety Risk Management procedures (see paragraph 1.2.5).

1.3.2 Prepare a Safety Plan Compliance Document (SPCD).

The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the CSPP. Also, it will not be possible to determine all safety plan details (for example specific hazard equipment and lighting, contractor's points of contact, construction equipment heights) during the development of the CSPP. The successful contractor must define such details by preparing an SPCD that the airport operator reviews for approval prior to issuance of a notice-to-proceed. The SPCD is a subset of the CSPP, similar to how a shop drawing review is a subset to the technical specifications.

1.3.3 Assume Responsibility for the CSPP.

The airport operator is responsible for establishing and enforcing the CSPP. The airport operator may use the services of an engineering consultant to help develop the CSPP. However, writing the CSPP cannot be delegated to the construction contractor. Only those details the airport operator determines cannot be addressed before contract award are developed by the contractor and submitted for approval as the SPCD. The SPCD does not restate nor propose differences to provisions already addressed in the CSPP.

1.4 Who Is Responsible for Safety During Construction?

1.4.1 Establish a Safety Culture.

Everyone has a role in operational safety on airports during construction: the airport operator, the airport's consultants, the construction contractor and subcontractors, airport users, airport tenants, ARFF personnel, Air Traffic personnel, including Technical Operations personnel, FAA Airports Division personnel, and others, such as military personnel at any airport supporting military operations (e.g. national guard or a joint use facility). Close communication and coordination between all affected parties is the key to maintaining safe operations. Such communication and coordination should start at the project scoping meeting and continue through the completion of the project. The airport operator and contractor should conduct onsite safety inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

1.4.2 Assess Airport Operator's Responsibilities.

An airport operator has overall responsibility for all activities on an airport, including construction. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on the responsibilities listed below can be found throughout this AC. The airport operator must:

1.4.2.1 Develop a CSPP that complies with the safety guidelines of Chapter 2, Construction Safety and Phasing Plans, and Chapter 3, Guidelines for Writing a CSPP. The airport operator may develop the CSPP internally or have a consultant develop the CSPP for approval by the airport operator. For tenant sponsored projects, approve a CSPP developed by the tenant or its consultant.

1.4.2.2 Require, review and approve the SPCD by the contractor that indicates how it will comply with the CSPP and provides details that cannot be determined before contract award.

1.4.2.3 Convene a preconstruction meeting with the construction contractor, consultant, airport employees and, if appropriate, tenant sponsor and other tenants to review and discuss project safety before beginning construction activity. The appropriate FAA representatives should be invited to attend the meeting. See AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects.* (Note "FAA" refers to the Airports Regional or District Office, the Air Traffic Organization, Flight Standards Service, and other offices that support airport operations, flight regulations, and construction/environmental policies.)

1.4.2.4 Ensure contact information is accurate for each representative/point of contact identified in the CSPP and SPCD.

1.4.2.5 Hold weekly or, if necessary, daily safety meetings with all affected parties to coordinate activities.

1.4.2.6 Notify users, ARFF personnel, and FAA ATO personnel of construction and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAM) and other methods, as appropriate. Convene a meeting for review and discussion if necessary.

1.4.2.7 Ensure construction personnel know applicable airport procedures and changes to those procedures that may affect their work.

1.4.2.8 Ensure that all temporary construction signs are located per the scheduled list for each phase of the project.

1.4.2.9 Ensure construction contractors and subcontractors undergo training required by the CSPP and SPCD.

1.4.2.10 Ensure vehicle and pedestrian operations addressed in the CSPP and SPCD are coordinated with airport tenants, the airport traffic control tower (ATCT), and construction contractors.

1.4.2.11 At certificated airports, ensure each CSPP and SPCD is consistent with Part 139.

1.4.2.12 Conduct inspections sufficiently frequently to ensure construction contractors and tenants comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.2.13 Take immediate action to resolve safety deficiencies.

1.4.2.14 At airports subject to 49 CFR Part 1542, *Airport Security*, ensure construction access complies with the security requirements of that regulation.

1.4.2.15 Notify appropriate parties when conditions exist that invoke provisions of the CSPP and SPCD (for example, implementation of low-visibility operations).

1.4.2.16 Ensure prompt submittal of a Notice of Proposed Construction or Alteration (Form 7460-1) for conducting an aeronautical study of potential obstructions such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. A separate form may be filed for each potential obstruction, or one form may be filed describing the entire construction area and maximum equipment height. In the latter case, a separate form must be filed for any object beyond or higher than the originally evaluated area/height. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp. The appropriate FAA Airports Regional or District Office can provide assistance in determining which objects require an aeronautical study.

1.4.2.17 Ensure prompt transmission of the Airport Sponsor Strategic Event Submission, FAA Form 6000-26, located at https://oeaaa.faa.gov/oeaaa/external/content/AIRPORT_SPONSOR_STRATEGIC_EVENT_SUBMISSION_FORM.pdf, to assure proper coordination for NAS Strategic Interruption per Service Level Agreement with ATO.

1.4.2.18 Promptly notify the FAA Airports Regional or District Office of any proposed changes to the CSPP prior to implementation of the change. Changes to the CSPP require review and approval by the airport operator and the FAA. The FAA Airports Regional or District office will determine if further coordination within the FAA is needed. Coordinate with appropriate local and other federal government agencies, such as Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Transportation Security Administration (TSA), and the state environmental agency.

1.4.3 Define Construction Contractor's Responsibilities.

The contractor is responsible for complying with the CSPP and SPCD. The contractor must:

1.4.3.1 Submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how it will comply with the requirements of the CSPP and supply any details that could not be determined before contract award. The SPCD must include a certification statement by the contractor, indicating an understanding of the operational safety requirements of the CSPP and the assertion of compliance with the approved CSPP and SPCD unless written approval is granted by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.

1.4.3.2 Have available at all times copies of the CSPP and SPCD for reference by the airport operator and its representatives, and by subcontractors and contractor employees.

1.4.3.3 Ensure that construction personnel are familiar with safety procedures and regulations on the airport. Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport. Many projects will require 24-hour coverage.

1.4.3.4 Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.

1.4.3.5 Conduct sufficient inspections to ensure construction personnel comply with the CSPP and SPCD and that there are no altered construction activities that could create potential safety hazards.

1.4.3.6 Restrict movement of construction vehicles and personnel to permitted construction areas by flagging, barricading, erecting temporary fencing, or providing escorts, as appropriate, and as specified in the CSPP and SPCD.

1.4.3.7 Ensure that no contractor employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations area (AOA) from the construction site unless authorized.

1.4.3.8 Ensure prompt submittal through the airport operator of Form 7460-1 for the purpose of conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, and other equipment), stock piles, and haul routes when different from cases previously filed by the airport operator. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

1.4.3.9 Ensure that all necessary safety mitigations are understood by all parties involved, and any special requirements of each construction phase will be fulfilled per the approved timeframe.

1.4.3.10 Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

1.4.4 Define Tenant's Responsibilities.

If planning construction activities on leased property, Airport tenants, such as airline operators, fixed base operators, and FAA ATO/Technical Operations sponsoring construction are strongly encouraged to:

1. Develop, or have a consultant develop, a project specific CSPP and submit it to the airport operator. The airport operator may forgo a complete CSPP submittal and instead incorporate appropriate operational safety principles and measures addressed in the advisory circular within their tenant lease agreements.
2. In coordination with its contractor, develop an SPCD and submit it to the airport operator for approval issued prior to issuance of a Notice to Proceed.
3. Ensure that construction personnel are familiar with safety procedures and regulations on the airport during all phases of the construction.
4. Provide a point of contact of who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
5. Identify in the SPCD the contractor's on-site employees responsible for monitoring compliance with the CSPP and SPCD during construction. At least one of these employees must be on-site when active construction is taking place.
6. Ensure that no tenant or contractor employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.
7. Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate, as specified in the CSPP and SPCD.
8. Ensure prompt submittal through the airport operator of Form 7460-1 for conducting an aeronautical study of contractor equipment such as tall equipment (cranes, concrete pumps, other), stock piles, and haul routes. The FAA encourages online submittal of forms for expediency at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.
9. Participate in pre-construction meetings to review construction limits, safety mitigations, NOTAMs, and understand all special airport operational needs during each phase of the project.

CHAPTER 2. CONSTRUCTION SAFETY AND PHASING PLANS

2.1 Overview.

Aviation safety is the primary consideration at airports, especially during construction. The airport operator's CSPP and the contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard. They must provide information necessary for the Airport Operations department to conduct airfield inspections and expeditiously identify and correct unsafe conditions during construction. All aviation safety provisions included within the project drawings, contract specifications, and other related documents must also be reflected in the CSPP and SPCD.

2.2 Assume Responsibility.

Operational safety on the airport remains the airport operator's responsibility at all times. The airport operator must develop, certify, and submit for FAA approval each CSPP. It is the airport operator's responsibility to apply the requirements of the FAA approved CSPP. The airport operator must revise the CSPP when conditions warrant changes and must submit the revised CSPP to the FAA for approval. The airport operator must also require and approve a SPCD from the project contractor.

2.3 Submit the CSPP.

Construction Safety and Phasing Plans should be developed concurrently with the project design. Milestone versions of the CSPP should be submitted for review and approval as follows. While these milestones are not mandatory, early submission will help to avoid delays. Submittals are preferred in 8.5 × 11 inch or 11 × 17 inch format for compatibility with the FAA's Obstruction Evaluation / Airport Airspace Analysis (OE / AAA) process.

2.3.1 Submit an Outline/Draft.

By the time approximately 25% to 30% of the project design is completed, the principal elements of the CSPP should be established. Airport operators are encouraged to submit an outline or draft, detailing all CSPP provisions developed to date, to the FAA for review at this stage of the project design.

2.3.2 Submit a CSPP.

The CSPP should be formally submitted for FAA approval when the project design is 80 percent to 90 percent complete. Since provisions in the CSPP will influence contract costs, it is important to obtain FAA approval in time to include all such provisions in the procurement contract.

2.3.3 Submit an SPCD.

The contractor should submit the SPCD to the airport operator for approval to be issued prior to the Notice to Proceed.

2.3.4 Submit CSPP Revisions.

All revisions to a previously approved CSPP must be re-submitted to the FAA for review and approval/disapproval action.

2.4 Meet CSPP Requirements.

2.4.1 To the extent possible, the CSPP should address the following as outlined in Chapter 3, Guidelines for Writing a CSPP. Details that cannot be determined at this stage are to be included in the SPCD.

1. Coordination.
    a. Contractor progress meetings.
    b. Scope or schedule changes.
    c. FAA ATO coordination.
2. Phasing.
    a. Phase elements.
    b. Construction safety drawings.
3. Areas and operations affected by the construction activity.
    a. Identification of affected areas.
    b. Mitigation of effects.
4. Protection of navigation aids (NAVAIDs).
5. Contractor access.
    a. Location of stockpiled construction materials.
    b. Vehicle and pedestrian operations.
6. Wildlife management.
    a. Trash.
    b. Standing water.
    c. Tall grass and seeds.
    d. Poorly maintained fencing and gates.
    e. Disruption of existing wildlife habitat.
7. Foreign Object Debris (FOD) management.
8. Hazardous materials (HAZMAT) management.
9. Notification of construction activities.

a. Maintenance of a list of responsible representatives/ points of contact.

b. NOTAM.

c. Emergency notification procedures.

d. Coordination with ARFF Personnel.

e. Notification to the FAA.

10. Inspection requirements.

a. Daily (or more frequent) inspections.

b. Final inspections.

11. Underground utilities.

12. Penalties.

13. Special conditions.

14. Runway and taxiway visual aids. Marking, lighting, signs, and visual NAVAIDs.

a. General.

b. Markings.

c. Lighting and visual NAVAIDs.

d. Signs, temporary, including orange construction signs, and permanent signs.

15. Marking and signs for access routes.

16. Hazard marking and lighting.

a. Purpose.

b. Equipment.

17. Work zone lighting for nighttime construction (if applicable).

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces.

a. Runway Safety Area (RSA).

b. Runway Object Free Area (ROFA).

c. Taxiway Safety Area (TSA). Provide details for any adjustments to Taxiway Safety Area width to allow continued operation of smaller aircraft. See paragraph 2.22.3.

d. Taxiway Object Free Area (TOFA). Provide details for any continued aircraft operations while construction occurs within the TOFA. See paragraph 2.22.4.

e. Obstacle Free Zone (OFZ).

f. Runway approach/departure surfaces.

19. Other limitations on construction.

a. Prohibitions.

b. Restrictions.

2.4.2 The Safety Plan Compliance Document (SPCD) should include a general statement by the construction contractor that he/she has read and will abide by the CSPP. In addition, the SPCD must include all supplemental information that could not be included in the CSPP prior to the contract award. The contractor statement should include the name of the contractor, the title of the project CSPP, the approval date of the CSPP, and a reference to any supplemental information (that is, "I, (Name of Contractor), have read the (Title of Project) CSPP, approved on (Date), and will abide by it as written and with the following additions as noted:"). The supplemental information in the SPCD should be written to match the format of the CSPP indicating each subject by corresponding CSPP subject number and title. If no supplemental information is necessary for any specific subject, the statement, "No supplemental information," should be written after the corresponding subject title. The SPCD should not duplicate information in the CSPP:

1. Coordination. Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.
2. Phasing. Discuss proposed construction schedule elements, including:
   a. Duration of each phase.
   b. Daily start and finish of construction, including "night only" construction.
   c. Duration of construction activities during:
      i. Normal runway operations.
      ii. Closed runway operations.
      iii. Modified runway "Aircraft Reference Code" usage.
3. Areas and operations affected by the construction activity. These areas and operations should be identified in the CSPP and should not require an entry in the SPCD.
4. Protection of NAVAIDs. Discuss specific methods proposed to protect operating NAVAIDs.
5. Contractor access. Provide the following:
   a. Details on how the contractor will maintain the integrity of the airport security fence (gate guards, daily log of construction personnel, and other).
   b. Listing of individuals requiring driver training (for certificated airports and as requested).
   c. Radio communications.
      i. Types of radios and backup capabilities.
      ii. Who will be monitoring radios.
      iii. Who to contact if the ATCT cannot reach the contractor's designated person by radio.

d. Details on how the contractor will escort material delivery vehicles.

6. Wildlife management. Discuss the following:
   a. Methods and procedures to prevent wildlife attraction.
   b. Wildlife reporting procedures.
7. Foreign Object Debris (FOD) management. Discuss equipment and methods for control of FOD, including construction debris and dust.
8. Hazardous Materials (HAZMAT) management. Discuss equipment and methods for responding to hazardous spills.
9. Notification of construction activities. Provide the following:
   a. Contractor points of contact.
   b. Contractor emergency contact.
   c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe for submitting 7460-1 forms not previously submitted by the airport operator.
   d. Batch plant details, including 7460-1 submittal.
10. Inspection requirements. Discuss daily (or more frequent) inspections and special inspection procedures.
11. Underground utilities. Discuss proposed methods of identifying and protecting underground utilities.
12. Penalties. Penalties should be identified in the CSPP and should not require an entry in the SPCD.
13. Special conditions. Discuss proposed actions for each special condition identified in the CSPP.
14. Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs. Discuss proposed visual aids including the following:
   a. Equipment and methods for covering signage and airfield lights.
   b. Equipment and methods for temporary closure markings (paint, fabric, other).
   c. Temporary orange construction signs.
   d. Types of temporary Visual Guidance Slope Indicators (VGSI).
15. Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.
16. Hazard marking and lighting. Discuss proposed equipment and methods for identifying excavation areas.
17. Work zone lighting for nighttime construction (if applicable). Discuss proposed equipment, locations, aiming, and shielding to prevent interference with air traffic control and aircraft operations.

18. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:
    a. Equipment and methods for maintaining Taxiway Safety Area standards.
    b. Equipment and methods to ensure the safe passage of aircraft where Taxiway Safety Area or Taxiway Object Free Area standards cannot be maintained.
    c. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
19. Other limitations on construction should be identified in the CSPP and should not require an entry in the SPCD.

2.5 **Coordination.**

Airport operators, or tenants responsible for design, bidding and conducting construction on their leased properties, should ensure at all project developmental stages, such as predesign, prebid, and preconstruction conferences, they capture the subject of airport operational safety during construction (see AC 150/5370-12, *Quality Management for Federally Funded Airport Construction Projects*). In addition, the following should be coordinated as required:

2.5.1 Progress Meetings.

Operational safety should be a standing agenda item for discussion during progress meetings throughout the project developmental stages.

2.5.2 Scope or Schedule Changes.

Changes in the scope or duration at any of the project stages may require revisions to the CSPP and review and approval by the airport operator and the FAA (see paragraph 1.4.2.17).

2.5.3 FAA ATO Coordination.

Early coordination with FAA ATO is highly recommended during the design phase and is required for scheduling Technical Operations shutdowns prior to construction. Coordination is critical to restarts of NAVAID services and to the establishment of any special procedures for the movement of aircraft. Formal agreements between the airport operator and appropriate FAA offices are recommended. All relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, should be coordinated with FAA ATO and may require an FAA flight inspection prior to restarting the facility. Flight inspections must be coordinated and scheduled well in advance of the intended facility restart. Flight inspections may require a reimbursable agreement between the airport operator and FAA ATO. Reimbursable agreements should be coordinated a minimum of 12 months prior to the start of construction. (See paragraph 2.13.5.3.2 for required FAA notification regarding FAA-owned NAVAIDs.)

2.6 **Phasing.**

Once it has been determined what types and levels of airport operations will be maintained, the most efficient sequence of construction may not be feasible. In this case, the sequence of construction may be phased to gain maximum efficiency while allowing for the required operations. The development of the resulting construction phases should be coordinated with local Air Traffic personnel and airport users. The sequenced construction phases established in the CSPP must be incorporated into the project design and must be reflected in the contract drawings and specifications.

2.6.1 Phase Elements.

For each phase the CSPP should detail:

- Areas closed to aircraft operations.
- Duration of closures.
- Taxi routes and/or areas of reduced TSA and TOFA to reflect reduced ADG use.
- ARFF access routes.
- Construction staging, disposal, and cleanout areas.
- Construction access and haul routes.
- Impacts to NAVAIDs.
- Lighting, marking, and signing changes.
- Available runway length and/or reduced RSA and ROFA to reflect reduced ADG use.
- Declared distances (if applicable).
- Required hazard marking, lighting, and signing.
- Work zone lighting for nighttime construction (if applicable).
- Lead times for required notifications.

2.6.2 Construction Safety Drawings.

Drawings specifically indicating operational safety procedures and methods in affected areas (i.e., construction safety drawings) should be developed for each construction phase. Such drawings should be included in the CSPP as referenced attachments and should also be included in the contract drawing package.

2.7 **Areas and Operations Affected by Construction Activity.**

Runways and taxiways should remain in use by aircraft to the maximum extent possible without compromising safety. Pre-meetings with the FAA ATO will support operational simulations. See Appendix E for an example of a table showing temporary operations versus current operations. The tables in Appendix E can be useful for coordination among all interested parties, including FAA Lines of Business.

2.7.1 Identification of Affected Areas.

Identifying areas and operations affected by the construction helps to determine possible safety problems. The affected areas should be identified in the construction safety drawings for each construction phase. (See paragraph 2.6.2.) Of particular concern are:

2.7.1.1 **Closing, or Partial Closing, of Runways, Taxiways and Aprons, and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing, landing, or takeoff in either direction on that pavement is prohibited. A displaced threshold, by contrast, is established to ensure obstacle clearance and adequate safety area for landing aircraft. The pavement prior to the displaced threshold is normally available for take-off in the direction of the displacement and for landing and takeoff in the opposite direction. Misunderstanding this difference, may result in issuance of an inaccurate NOTAM, and can lead to a hazardous condition.

2.7.1.1.1 Partially Closed Runways.

The temporarily closed portion of a partially closed runway will generally extend from the threshold to a taxiway that may be used for entering and exiting the runway. If the closed portion extends to a point between taxiways, pilots will have to back-taxi on the runway, which is an undesirable operation. See Figure 2-1 for a desirable configuration.

2.7.1.1.2 Displaced Thresholds.

Since the portion of the runway pavement between the permanent threshold and a standard displaced threshold is available for takeoff and for landing in the opposite direction, the temporary displaced threshold need not be located at an entrance/exit taxiway. See Figure 2-2.

2.7.1.2 Closing of aircraft rescue and fire fighting access routes.

2.7.1.3 Closing of access routes used by airport and airline support vehicles.

2.7.1.4 Interruption of utilities, including water supplies for fire fighting.

2.7.1.5 Approach/departure surfaces affected by heights of objects.

2.7.1.6 Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads.

Figure 2-1. Temporary Partially Closed Runway

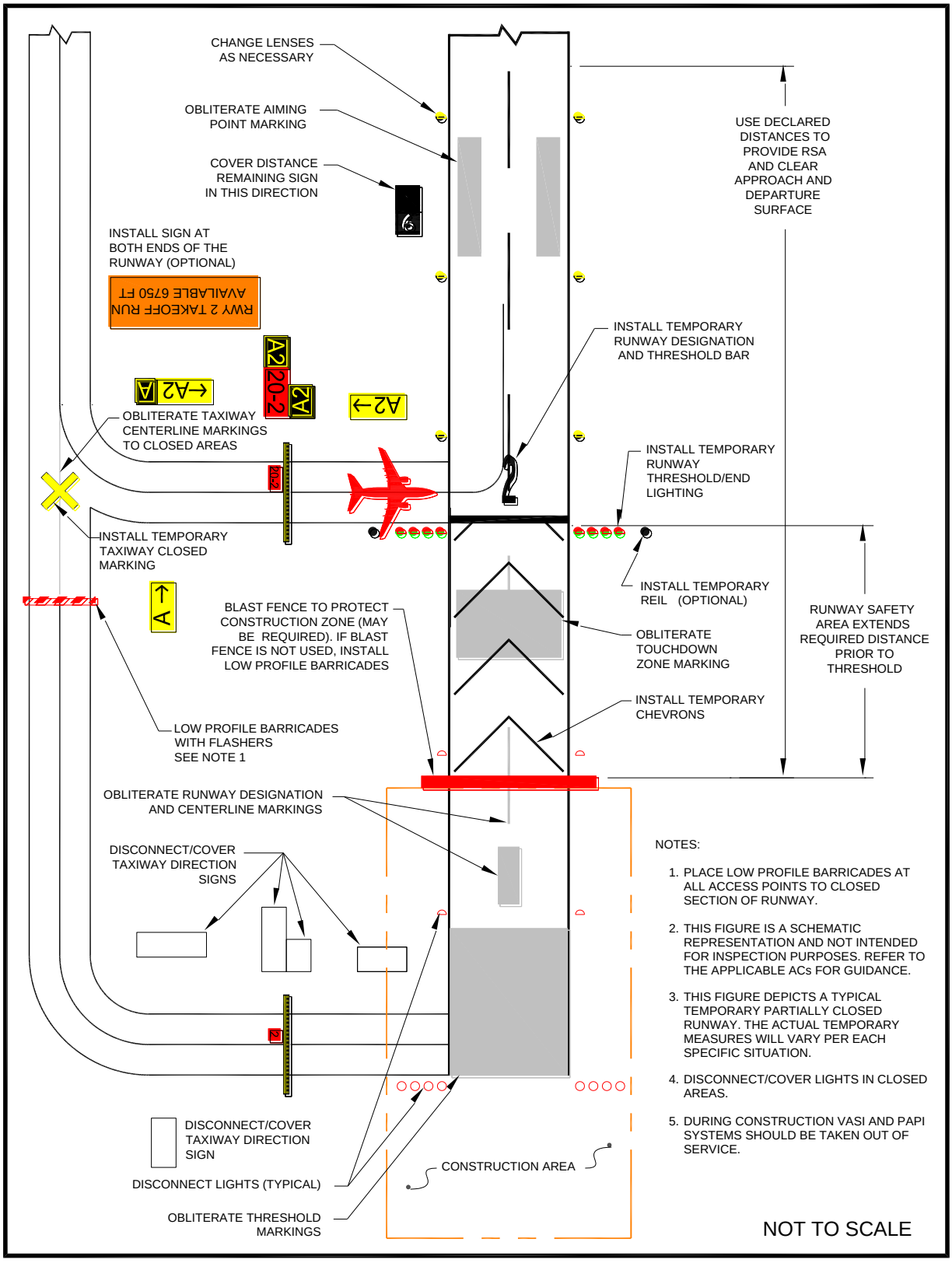
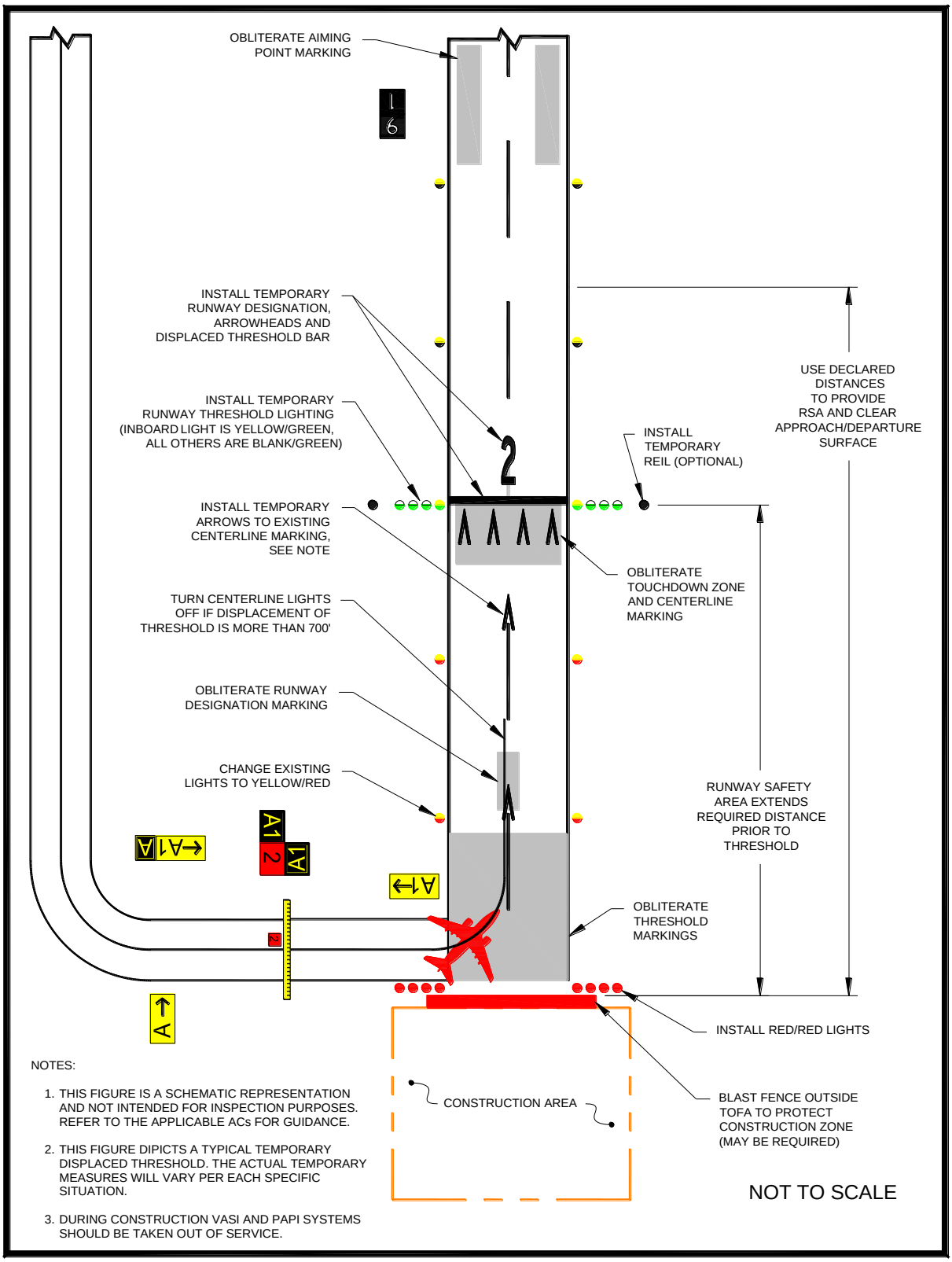


Figure 2-2. Temporary Displaced Threshold



Note: See paragraph 2.18.2.5.

2.7.2 Mitigation of Effects.

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. The CSPP must address:

2.7.2.1 Temporary changes to runway and/or taxi operations.

2.7.2.2 Detours for ARFF and other airport vehicles.

2.7.2.3 Maintenance of essential utilities.

2.7.2.4 Temporary changes to air traffic control procedures. Such changes must be coordinated with the ATO.

2.8 Navigation Aid (NAVAID) Protection.

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordinate with the appropriate FAA ATO/Technical Operations office to evaluate the effect of construction activity and the required distance and direction from the NAVAID. (See paragraph 2.13.5.3.) Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDs require special consideration since they may interfere with signals essential to air navigation. If any NAVAID may be affected, the CSPP and SPCD must show an understanding of the "critical area" associated with each NAVAID and describe how it will be protected. Where applicable, the operational critical areas of NAVAIDs should be graphically delineated on the project drawings. Pay particular attention to stockpiling material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction equipment and activities may require NAVAID shutdown or adjustment of instrument approach minimums for low visibility operations. This condition requires that a NOTAM be filed (see paragraph 2.13.2). Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. (See paragraph 2.13.5.3.)

2.9 Contractor Access.

The CSPP must detail the areas to which the contractor must have access, and explain how contractor personnel will access those areas. Specifically address:

2.9.1 Location of Stockpiled Construction Materials.

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ, and if possible should not be permitted within the Object Free Area (OFA) of an operational runway. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. (See paragraph 2.18.2.) This includes determining and

verifying that materials are stabilized and stored at an approved location so as not to be a hazard to aircraft operations and to prevent attraction of wildlife and foreign object damage from blowing or tracked material. See paragraphs 2.10 and 2.11.

2.9.2 Vehicle and Pedestrian Operations.

The CSPP should include specific vehicle and pedestrian requirements. Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. The airport operator should coordinate requirements for vehicle operations with airport tenants, contractors, and the FAA air traffic manager. In regard to vehicle and pedestrian operations, the CSPP should include the following, with associated training requirements:

2.9.2.1 **Construction Site Parking.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the AOA. These areas should provide reasonable contractor employee access to the job site.

2.9.2.2 **Construction Equipment Parking.**

Contractor employees must park and service all construction vehicles in an area designated by the airport operator outside the OFZ and never in the safety area of an active runway or taxiway. Unless a complex setup procedure makes movement of specialized equipment infeasible, inactive equipment must not be parked on a closed taxiway or runway. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids. The FAA must also study those areas to determine effects on airport design criteria, surfaces established by 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (Part 77), and on NAVAIDs and Instrument Approach Procedures (IAP). See paragraph 2.13.1 for further information.

2.9.2.3 **Access and Haul Roads.**

Determine the construction contractor’s access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Access routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Pay special attention to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul

roads does not interfere with NAVAIDs or approach surfaces of operational runways. Address whether access gates will be blocked or inoperative or if a rally point will be blocked or inaccessible.

2.9.2.4 Marking and lighting of vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

2.9.2.5 Description of proper vehicle operations on various areas under normal, lost communications, and emergency conditions.

2.9.2.6 Required escorts.

2.9.2.7 **Training Requirements for Vehicle Drivers to Ensure Compliance with the Airport Operator's Vehicle Rules and Regulations.**

Specific training should be provided to vehicle operators, including those providing escorts. See AC 150/5210-20, *Ground Vehicle Operations on Airports*, for information on training and records maintenance requirements.

2.9.2.8 **Situational Awareness.**

Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. At non-towered airports, all aircraft movements and flight operations rely on aircraft operators to self-report their positions and intentions. However, there is no requirement for an aircraft to have radio communications. Because aircraft do not always broadcast their positions or intentions, visual checking, radio monitoring, and situational awareness of the surroundings is critical to safety.

2.9.2.9 **Two-Way Radio Communication Procedures.**

2.9.2.9.1 General.

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCT. When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact, as directed by the airport operator, with:

1. Airport operations
2. ATCT

3. Common Traffic Advisory Frequency (CTAF), which may include UNICOM, MULTICOM.
4. Automatic Terminal Information Service (ATIS). This frequency is useful for monitoring conditions on the airport. Local air traffic will broadcast information regarding construction related runway closures and "shortened" runways on the ATIS frequency.

2.9.2.9.2 Areas Requiring Two-Way Radio Communication with the ATCT.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport.

2.9.2.9.3 Frequencies to be Used.

The airport operator will specify the frequencies to be used by the contractor, which may include the CTAF for monitoring of aircraft operations. Frequencies may also be assigned by the airport operator for other communications, including any radio frequency in compliance with Federal Communications Commission requirements. At airports with an ATCT, the airport operator will specify the frequency assigned by the ATCT to be used between contractor vehicles and the ATCT.

2.9.2.9.4 Proper radio usage, including read back requirements.

2.9.2.9.5 Proper phraseology, including the International Phonetic Alphabet.

2.9.2.9.6 Light Gun Signals.

Even though radio communication is maintained, escort vehicle drivers must also familiarize themselves with ATCT light gun signals in the event of radio failure. See the FAA safety placard "Ground Vehicle Guide to Airport Signs and Markings." This safety placard may be downloaded through the Runway Safety Program Web site at http://www.faa.gov/airports/runway_safety/publications/ (see "Signs & Markings Vehicle Dashboard Sticker") or obtained from the FAA Airports Regional Office.

2.9.2.10 **Maintenance of the secured area of the airport, including:**

2.9.2.10.1 Fencing and Gates.

Airport operators and contractors must take care to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and unauthorized people. Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit "piggybacking" behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-

00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

2.9.2.10.2 Badging Requirements.

Airports subject to 49 CFR Part 1542, *Airport Security*, must meet standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel.

2.10 Wildlife Management.

The CSPP and SPCD must be in accordance with the airport operator's wildlife hazard management plan, if applicable. See AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports,* and CertAlert 98-05, *Grasses Attractive to Hazardous Wildlife.* Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports, such as:

2.10.1 Trash.

Food scraps must be collected from construction personnel activity.

2.10.2 Standing Water.

2.10.3 Tall Grass and Seeds.

Requirements for turf establishment can be at odds with requirements for wildlife control. Grass seed is attractive to birds. Lower quality seed mixtures can contain seeds of plants (such as clover) that attract larger wildlife. Seeding should comply with the guidance in AC 150/5370-10, *Standards for Specifying Construction of Airports,* Item T-901, Seeding. Contact the local office of the United Sates Department of Agriculture Soil Conservation Service or the State University Agricultural Extension Service (County Agent or equivalent) for assistance and recommendations. These agencies can also provide liming and fertilizer recommendations.

2.10.4 Poorly Maintained Fencing and Gates.

See paragraph 2.9.2.10.1.

2.10.5 Disruption of Existing Wildlife Habitat.

While this will frequently be unavoidable due to the nature of the project, the CSPP should specify under what circumstances (location, wildlife type) contractor personnel should immediately notify the airport operator of wildlife sightings.

2.11 Foreign Object Debris (FOD) Management.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) or covers may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, *Foreign Object Debris (FOD) Management.*

2.12 Hazardous Materials (HAZMAT) Management.

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. See AC 150/5320-15, *Management of Airport Industrial Waste.*

2.13 Notification of Construction Activities.

The CSPP and SPCD must detail procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport. It must address the notification actions described below, as applicable.

2.13.1 List of Responsible Representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours.

2.13.2 NOTAMs.

Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager, or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The airport operator must file and maintain a list of authorized representatives with the FSS. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMs) for Airport Operators,* for a sample NOTAM form. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator. See paragraph 2.7.1.1 about issuing NOTAMs for partially closed runways versus runways with displaced thresholds.

2.13.3 Emergency notification procedures for medical, fire fighting, and police response.

2.13.4 Coordination with ARFF.

The CSPP must detail procedures for coordinating through the airport sponsor with ARFF personnel, mutual aid providers, and other emergency services if construction requires:

1. The deactivation and subsequent reactivation of water lines or fire hydrants, or
2. The rerouting, blocking and restoration of emergency access routes, or
3. The use of hazardous materials on the airfield.

2.13.5 Notification to the FAA.

2.13.5.1 **Part 77.**

Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, other equipment) on airports. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, can be used for this purpose and submitted to the appropriate FAA Airports Regional or District Office. See Appendix A to download the form. Further guidance is available on the FAA web site at oeaaa.faa.gov.

2.13.5.2 **Part 157.**

With some exceptions, Title 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, *Notice of Landing Area Proposal*, to the nearest FAA Airports Regional or District Office. See Appendix A to download the form.

2.13.5.3 **NAVAIDs.**

For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

2.13.5.3.1 Airport Owned/FAA Maintained.

If construction operations require a shutdown of 24 hours or greater in duration, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown, using Strategic Event Coordination (SEC) Form 6000.26 contained within FAA Order 6000.15, *General Maintenance Handbook for National Airspace System (NAS) Facilities*.

2.13.5.3.2 FAA Owned.

1. The airport operator must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs, using SEC Form 6000.26.
2. Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. Refer to active Service Level Agreement with ATO for specifics.

2.14 **Inspection Requirements.**

2.14.1 Daily Inspections.

Inspections should be conducted at least daily, but more frequently if necessary to ensure conformance with the CSPP. A sample checklist is provided in Appendix D, Construction Project Daily Safety Inspection Checklist. See also AC 150/5200-18, *Airport Safety Self-Inspection.* Airport operators holding a Part 139 certificate are required to conduct self-inspections during unusual conditions, such as construction activities, that may affect safe air carrier operations.

2.14.2 Interim Inspections.

Inspections should be conducted of all areas to be (re)opened to aircraft traffic to ensure the proper operation of lights and signs, for correct markings, and absence of FOD. The contractor should conduct an inspection of the work area with airport operations personnel. The contractor should ensure that all construction materials have been secured, all pavement surfaces have been swept clean, all transition ramps have been properly constructed, and that surfaces have been appropriately marked for aircraft to operate safely. Only if all items on the list meet with the airport operator's approval should the air traffic control tower be notified to open the area to aircraft operations. The contractor should be required to retain a suitable workforce and the necessary equipment at the work area for any last minute cleanup that may be requested by the airport operator prior to opening the area.

2.14.3 Final Inspections.

New runways and extended runway closures may require safety inspections at certificated airports prior to allowing air carrier service. Coordinate with the FAA Airport Certification Safety Inspector (ACSI) to determine if a final inspection will be necessary.

2.15 **Underground Utilities.**

The CSPP and/or SPCD must include procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas. This may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that "One Call" or "Miss Utility" services do not include FAA ATO/Technical Operations.

2.16 **Penalties.**

The CSPP should detail penalty provisions for noncompliance with airport rules and regulations and the safety plans (for example, if a vehicle is involved in a runway incursion). Such penalties typically include rescission of driving privileges or access to the AOA.

2.17 **Special Conditions.**

The CSPP must detail any special conditions that affect the operation of the airport and will require the activation of any special procedures (for example, low-visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, Vehicle / Pedestrian Deviation (VPD) and other activities requiring construction suspension/resumption).

2.18 **Runway and Taxiway Visual Aids.**

This includes marking, lighting, signs, and visual NAVAIDs. The CSPP must ensure that areas where aircraft will be operating are clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs, and visual NAVAIDs that are to continue to perform their functions during construction remain in place and operational. Visual NAVAIDs that are not serving their intended function during construction must be temporarily disabled, covered, or modified as necessary. The CSPP must address the following, as appropriate:

2.18.1 General.

Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, and other wind currents and constructed of materials that will minimize damage to an aircraft in the event of inadvertent contact. Items used to secure such markings must be of a color similar to the marking.

2.18.2 Markings.

During the course of construction projects, temporary pavement markings are often required to allow for aircraft operations during or between work periods. During the design phase of the project, the designer should coordinate with the project manager,

airport operations, airport users, the FAA Airports project manager, and Airport Certification Safety Inspector for Part 139 airports to determine minimum temporary markings. The FAA Airports project manager will, wherever a runway is closed, coordinate with the appropriate FAA Flight Standards Office and disseminate findings to all parties. Where possible, the temporary markings on finish grade pavements should be placed to mirror the dimensions of the final markings. Markings must be in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*, except as noted herein. Runways and runway exit taxiways closed to aircraft operations are marked with a yellow X. The preferred visual aid to depict temporary runway closure is the lighted X signal placed on or near the runway designation numbers. (See paragraph 2.18.2.1.2.)

2.18.2.1 **Closed Runways and Taxiways.**

2.18.2.1.1 Permanently Closed Runways.

For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place an X at each end and at 1,000-foot (300 m) intervals. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X.

2.18.2.1.2 Temporarily Closed Runways.

For runways that have been temporarily closed, place an X at each end of the runway directly on or as near as practicable to the runway designation numbers. For a multiple runway environment, if the lighted X on a designated number will be located in the RSA of an adjacent active runway, locate the lighted X farther down the closed runway to clear the RSA of the active runway. In addition, the closed runway numbers located in the RSA of an active runway must be marked with a flat yellow X. See Figure 2-3. See also paragraph 2.18.3.3.

2.18.2.1.3 Partially Closed Runways and Displaced Thresholds.

When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, the markings must comply with AC 150/5340-1. An X is not used on a partially closed runway or a runway with a displaced threshold. See paragraph 2.7.1.1 for the difference between partially closed runways and runways with displaced thresholds. Because of the temporary nature of threshold displacement due to construction, it is not necessary to re-adjust the existing runway centerline markings to meet standard spacing for a runway with a visual approach. Some of the requirements below may be waived in the cases of low-activity airports and/or short duration changes that are measured in days rather than weeks. Consider whether the presence of an airport traffic

control tower allows for the development of special procedures. Contact the appropriate FAA Airports Regional or District Office for assistance.

Figure 2-3. Markings for a Temporarily Closed Runway

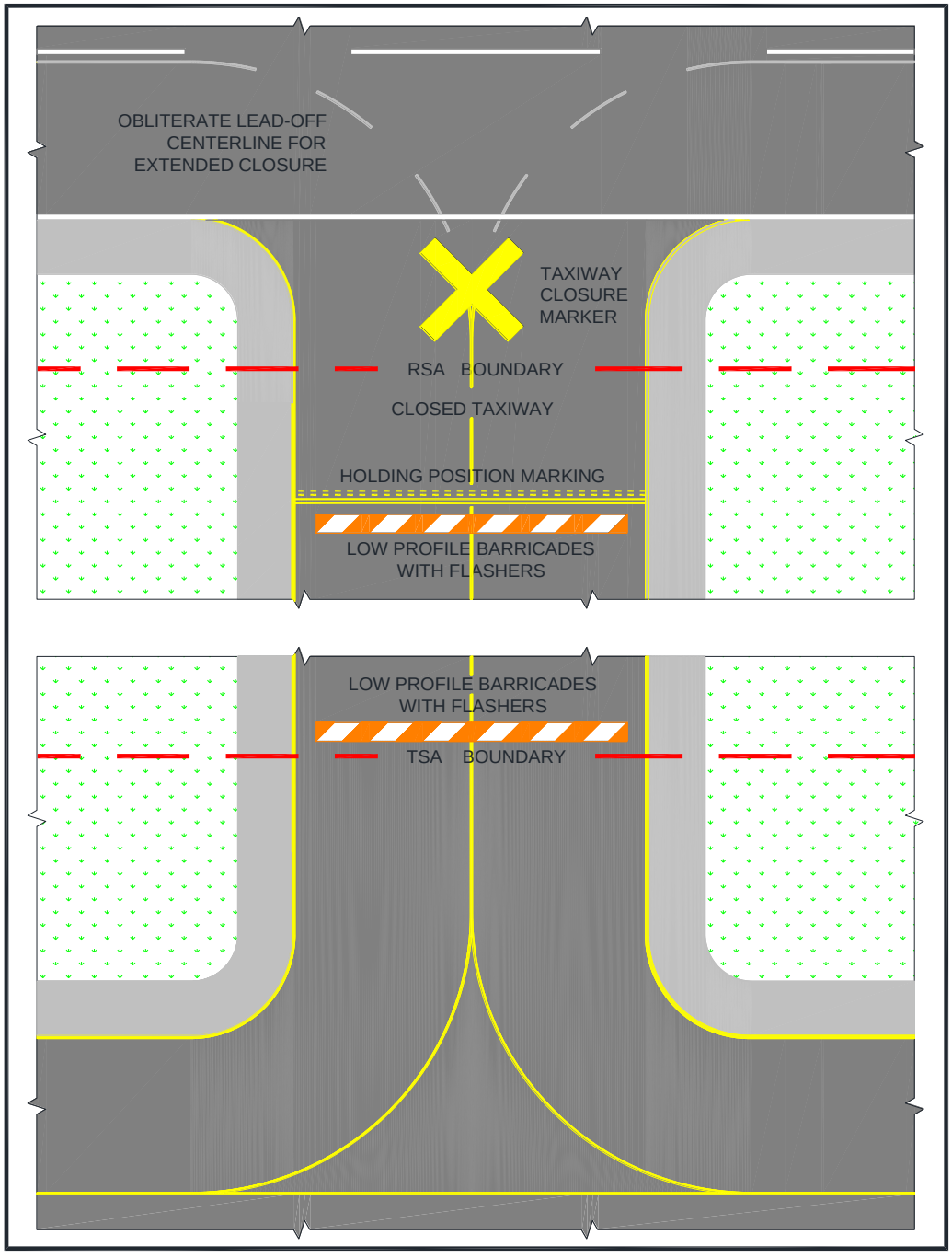


1. **Partially Closed Runways.** Pavement markings for temporary closed portions of the runway consist of a runway threshold bar, runway designation, and yellow chevrons to identify pavement areas that are unsuitable for takeoff or landing (see AC 150/5340-1). Obliterate or cover markings prior to the moved threshold. Existing touchdown zone markings beyond the moved threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-4.
2. **Displaced Thresholds.** Pavement markings for a displaced threshold consist of a runway threshold bar, runway designation, and white arrowheads with and without arrow shafts. These markings are required to identify the portion of the runway before the displaced threshold to provide centerline guidance for pilots during approaches, takeoffs, and landing rollouts from the opposite direction. See AC 150/5340-1. Obliterate markings prior to the displaced threshold. Existing touchdown zone markings beyond the displaced threshold may remain in place. Obliterate aiming point markings. Issue appropriate NOTAMs regarding any nonstandard markings. See Figure 2-2.

2.18.2.1.4 Taxiways.

1. **Permanently Closed Taxiways.** AC 150/5300-13 *Airport Design*, notes that it is preferable to remove the pavement, but for pavement that is to remain, place an X at the entrance to both ends of the closed section. Obliterate taxiway centerline markings, including runway leadoff lines, leading to the closed taxiway. See Figure 2-4.

Figure 2-4. Temporary Taxiway Closure



2. **Temporarily Closed Taxiways.** Place barricades outside the safety area of intersecting taxiways. For runway/taxiway intersections, place an X at the entrance to the closed taxiway from the runway. If the taxiway will be closed for an extended period, obliterate taxiway centerline markings, including runway leadoff lines and taxiway to taxiway turns, leading to the closed section. Always obliterate runway lead-off lines for high speed exits, regardless of the duration of the closure. If the centerline markings will be reused upon reopening the taxiway, it is preferable to paint over the marking. This will result in less damage to the pavement when the upper layer of paint is ultimately removed. See Figure 2-4.

2.18.2.1.5 Temporarily Closed Airport.

When the airport is closed temporarily, mark all the runways as closed.

2.18.2.2 If unable to paint temporary markings on the pavement, construct them from any of the following materials: fabric, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and appropriately secured to prevent movement by prop wash, jet blast, or other wind currents. Items used to secure such markings must be of a color similar to the marking.

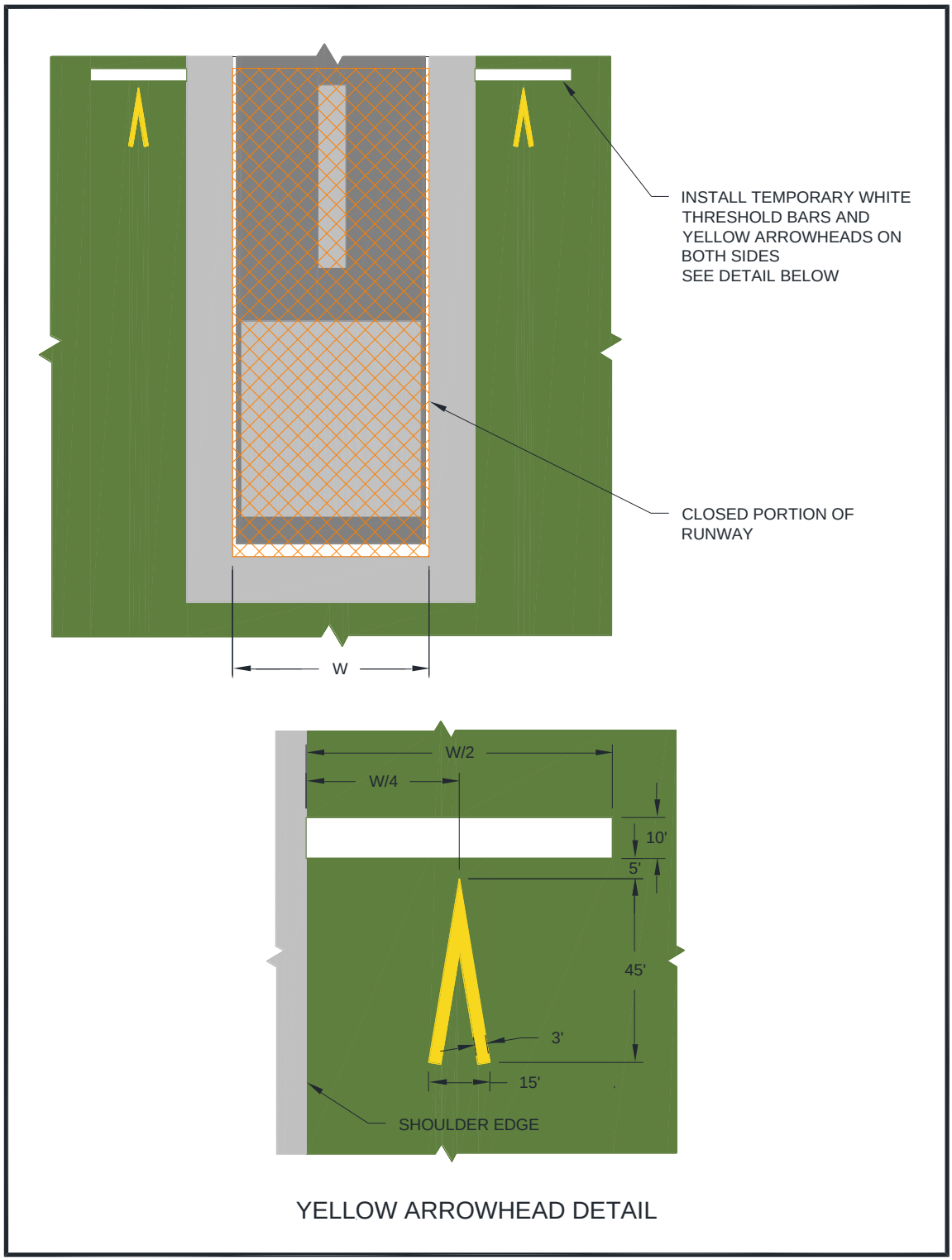
2.18.2.3 It may be necessary to remove or cover runway markings, including but not limited to, runway designation markings, threshold markings, centerline markings, edge stripes, touchdown zone markings and aiming point markings, depending on the length of construction and type of activity at the airport. When removing runway markings, apply the same treatment to areas between stripes or numbers, as the cleaned area will appear to pilots as a marking in the shape of the treated area.

2.18.2.4 If it is not possible to install threshold bars, chevrons, and arrows on the pavement, "temporary outboard white threshold bars and yellow arrowheads", see Figure 2-5, may be used. Locate them outside of the runway pavement surface on both sides of the runway. The dimensions must be as shown in Figure 2-5. If the markings are not discernible on grass or snow, apply a black background with appropriate material over the ground to ensure they are clearly visible.

2.18.2.5 The application rate of paint to mark a short-term temporary runway and taxiway markings may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10), but the dimensions must meet the existing standards. When applying temporary markings at night, it is recommended that the fast curing, Type II paint be used to help offset the higher humidity and cooler temperatures often experienced at night. Diluting the paint will substantially increase cure time and is not recommended. Glass beads are not recommended for temporary markings. Striated markings may also be used for certain temporary markings. AC

150/5340-1, *Standards for Airport Markings*, has additional guidance on temporary markings.

Figure 2-5. Temporary Outboard White Threshold Bars and Yellow Arrowheads



2.18.3 Lighting and Visual NAVAIDs.

This paragraph refers to standard runway and taxiway lighting systems. See below for hazard lighting. Lighting installation must be in conformance with AC 150/5340-30, *Design and Installation Details for Airport Visual Aids,* and fixture design in conformance with AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights.* When disconnecting runway and taxiway lighting fixtures, disconnect the associated isolation transformers. See AC 150/5340-26, *Maintenance of Airport Visual Aid Facilities*, for disconnect procedures and safety precautions. Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value. Secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources. Maintain mandatory hold signs to operate normally in any situation where pilots or vehicle drivers could mistakenly be in that location. At towered airports certificated under Part 139, holding position signs are required to be illuminated on open taxiways crossing to closed or inactive runways. If the holding position sign is installed on the runway circuit for the closed runway, install a jumper to the taxiway circuit to provide power to the holding position sign for nighttime operations. Where it is not possible to maintain power to signs that would normally be operational, install barricades to exclude aircraft. Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4 illustrate temporary changes to lighting and visual NAVAIDs.

2.18.3.1 **Permanently Closed Runways and Taxiways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits.

2.18.3.2 **Temporarily Closed Runways and New Runways Not Yet Open to Air Traffic.**

If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach. (Note that the lighted X must be illuminated at all times that it is on a runway.) The use of a lighted X is required if night work requires runway lighting to be on. See AC 150/5345-55, *Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure.* For runways that have been temporarily closed, but for an extended period, and for those with pilot controlled lighting, disconnect the lighting circuits or secure switches to prevent inadvertent activation. For runways that will be opened periodically, coordinate procedures with the FAA air traffic manager or, at airports without an ATCT, the airport operator. Activate stop bars if available. Figure 2-6 shows a lighted X by day. Figure 2-7 shows a lighted X at night.

Figure 2-6. Lighted X in Daytime



Figure 2-7. Lighted X at Night



2.18.3.3 **Partially Closed Runways and Displaced Thresholds.**

When a runway is partially closed, a portion of the pavement is unavailable for any aircraft operation, meaning taxiing and landing or taking off in either direction. A displaced threshold, by contrast, is put in place to ensure obstacle clearance by landing aircraft. The pavement prior to the displaced threshold is available for takeoff in the direction of the displacement, and for landing and takeoff in the opposite direction. Misunderstanding this difference and issuance of a subsequently inaccurate NOTAM can result in a hazardous situation. For both partially

closed runways and displaced thresholds, approach lighting systems at the affected end must be placed out of service.

2.18.3.3.1 Partially Closed Runways.

Disconnect edge and threshold lights on that part of the runway at and behind the threshold (that is, the portion of the runway that is closed). Alternately, cover the light fixtures in such a way as to prevent light leakage. See Figure 2-1.

2.18.3.3.2 Temporary Displaced Thresholds.

Edge lighting in the area of the displacement emits red light in the direction of approach and yellow light (white for visual runways) in the opposite direction. If the displacement is 700 feet or less, blank out centerline lights in the direction of approach or place the centerline lights out of service. If the displacement is over 700 feet, place the centerline lights out of service. See AC 150/5340-30 for details on lighting displaced thresholds. See Figure 2-2.

2.18.3.3.3 Temporary runway thresholds and runway ends must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions.

2.18.3.3.4 A temporary threshold on an unlighted runway may be marked by retroreflective, elevated markers in addition to markings noted in paragraph 2.18.2.1.3. Markers seen by aircraft on approach are green. Markers at the rollout end of the runway are red. At certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR Part 139.309). At non-certificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39, *Specification for L-853, Runway and Taxiway Retroreflective Markers.*

2.18.3.3.5 Temporary threshold lights and runway end lights and related visual NAVAIDs are installed outboard of the edges of the full-strength pavement only when they cannot be installed on the pavement. They are installed with bases at grade level or as low as possible, but not more than 3 inch (7.6 cm) above ground. (The standard above ground height for airport lighting fixtures is 14 inches (35 cm)). When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage. See AC 150/5370-10.

2.18.3.3.6 Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-30. Battery powered, solar, or portable lights that meet the criteria in AC 150/5345-50 may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operations but may

be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight Standards Division of the applicable FAA Regional Office.

2.18.3.3.7 When runway thresholds are temporarily displaced, reconfigure yellow lenses (caution zone), as necessary, and place the centerline lights out of service.

2.18.3.3.8 Relocate the Visual Glide Slope Indicator (VGSI), such as Visual Approach Slope Indicator (VASI) and Precision Approach Path Indicator (PAPI); other airport lights, such as Runway End Identifier Lights (REIL); and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local ATO/Technical Operations Office. Relocation of such visual aids will depend on the duration of the project and the benefits gained from the relocation, as this can result in great expense. See FAA JO 6850.2, *Visual Guidance Lighting Systems,* for installation criteria for FAA owned and operated NAVAIDs.

2.18.3.3.9 Issue a NOTAM to inform pilots of temporary lighting conditions.

2.18.3.4 **Temporarily Closed Taxiways.**

If possible, deactivate the taxiway lighting circuits. When deactivation is not possible (for example other taxiways on the same circuit are to remain open), cover the light fixture in a way as to prevent light leakage.

2.18.4 Signs.

To the extent possible, signs must be in conformance with AC 150/5345-44, *Specification for Runway and Taxiway Signs*, and AC 150/5340-18, *Standard for Airport Sign Systems.*

2.18.4.1 **Existing Signs.**

Runway exit signs are to be covered for closed runway exits. Outbound destination signs are to be covered for closed runways. Any time a sign does not serve its normal function or would provide conflicting information, it must be covered or removed to prevent misdirecting pilots. Note that information signs identifying a crossing taxiway continue to perform their normal function even if the crossing taxiway is closed. For long term construction projects, consider relocating signs, especially runway distance remaining signs.

2.18.4.2 **Temporary Signs.**

Orange construction signs comprise a message in black on an orange background. Orange construction signs may help pilots be aware of changed conditions. The airport operator may choose to introduce these signs as part of a movement area construction project to increase situational awareness when needed. Locate signs outside the taxiway safety limits and ahead of construction areas so pilots can take timely action. Use temporary signs judiciously, striking a balance between the need for information and the increase in pilot workload. When there is a concern of pilot "information overload," the applicability of mandatory hold signs must take precedence over orange construction signs recommended during construction. Temporary signs must meet the standards for such signs in Engineering Brief 93, *Guidance for the Assembly and Installation of Temporary Orange Construction Signs.* Many criteria in AC 150/5345-44, *Specification for Runway and Taxiway Signs,* are referenced in the Engineering Brief. Permissible sign legends are:

1. CONSTRUCTION AHEAD,
2. CONSTRUCTION ON RAMP, and
3. RWY XX TAKEOFF RUN AVAILABLE XXX FT.

Phasing, supported by drawings and sign schedule, for the installation of orange construction signs must be included in the CSPP or SPCD.

2.18.4.2.1 Takeoff Run Available (TORA) signs.

Recommended: Where a runway has been shortened for takeoff, install orange TORA signs well before the hold lines, such as on a parallel taxiway prior to a turn to a runway hold position. See EB 93 for sign size and location.

2.18.4.2.2 Sign legends are shown in Figure F-1.

Note: See Figure E-1, Figure E-2, Figure E-3, Figure F-2, and Figure F-3 for examples of orange construction sign locations.

2.19 **Marking and Signs for Access Routes.**

The CSPP should indicate that pavement markings and signs for construction personnel will conform to AC 150/5340-18 and, to the extent practicable, with the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft must comply with the frangibility requirements of AC 150/5220-23, *Frangible Connections,* which may require modification to size and height guidance in the MUTCD.

2.20 **Hazard Marking, Lighting and Signing.**

2.20.1 Hazard marking, lighting, and signing prevent pilots from entering areas closed to aircraft, and prevent construction personnel from entering areas open to aircraft. The CSPP must specify prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Hazard marking and lighting must also be specified to identify open manholes, small areas under repair, stockpiled material, waste areas, and areas subject to jet blast. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

2.20.2 Equipment.

2.20.2.1 **Barricades.**

Low profile barricades, including traffic cones, (weighted or sturdily attached to the surface) are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. Careful consideration must be given to selecting equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast. The spacing of barricades must be such that a breach is physically prevented barring a deliberate act. For example, if barricades are intended to exclude aircraft, gaps between barricades must be smaller than the wingspan of the smallest aircraft to be excluded; if barricades are intended to exclude vehicles, gaps between barricades must be smaller than the width of the excluded vehicles, generally 4 feet (1.2 meters). Provision must be made for ARFF access if necessary. If barricades are intended to exclude pedestrians, they must be continuously linked. Continuous linking may be accomplished through the use of ropes, securely attached to prevent FOD.

2.20.2.2 **Lights.**

Lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 feet (3 meters). Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the contractor turn them on manually during periods of low visibility during daytime hours.

2.20.2.3 **Supplement Barricades with Signs (for example) As Necessary.**

Examples are “No Entry” and “No Vehicles.” Be aware of the increased effects of wind and jet blast on barricades with attached signs.

2.20.2.4 **Air Operations Area – General.**

Barricades are not permitted in any active safety area or on the runway side of a runway hold line. Within a runway or taxiway object free area, and on aprons, use orange traffic cones, flashing or steady burning red lights as noted above, highly reflective collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inch (50 by 50 cm) square and securely fastened to eliminate FOD. All barricades adjacent to any open runway or taxiway / taxilane safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, and other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inch (7.6 cm) above the ground. Figure 2-8 and Figure 2-9 show sample barricades with proper coloring and flags.

Figure 2-8. Interlocking Barricades



Figure 2-9. Low Profile Barricades



2.20.2.5 **Air Operations Area – Runway/Taxiway Intersections.**

Use highly reflective barricades with lights to close taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones is appropriate for short duration closures.

2.20.2.6 **Air Operations Area – Other.**

Beyond runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels.

2.20.2.7 **Maintenance.**

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person's information with the airport operator. Lighting should be checked for proper operation at least once per day, preferably at dusk.

2.21 Work Zone Lighting for Nighttime Construction.

Lighting equipment must adequately illuminate the work area if the construction is to be performed during nighttime hours. Refer to AC 150/5370-10 for minimum illumination levels for nighttime paving projects. Additionally, it is recommended that all support equipment, except haul trucks, be equipped with artificial illumination to safely

illuminate the area immediately surrounding their work areas. The lights should be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from ATCT cabs and active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. Construction lighting units should be identified and generally located on the construction phasing plans in relationship to the ATCT and active runways and taxiways.

2.22 **Protection of Runway and Taxiway Safety Areas.**

Runway and taxiway safety areas, OFZs, OFAs, and approach surfaces are described in AC 150/5300-13. Protection of these areas includes limitations on the location and height of equipment and stockpiled material. An FAA airspace study may be required. Coordinate with the appropriate FAA Airports Regional or District Office if there is any doubt as to requirements or dimensions (see paragraph 2.13.5) as soon as the location and height of materials or equipment are known. The CSPP should include drawings showing all safety areas, object free areas, obstacle free zones and approach departure surfaces affected by construction.

2.22.1 Runway Safety Area (RSA).

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13). Construction activities within the existing RSA are subject to the following conditions:

2.22.1.1 No construction may occur within the existing RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction. (See AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may provide the necessary RSA under certain circumstances. Coordinate with the appropriate FAA Airports Regional or District Office to have declared distances information published, and appropriate NOTAMs issued. See AC 150/5300-13 for guidance on the use of declared distances.

2.22.1.2 The airport operator must coordinate the adjustment of RSA dimensions as permitted above with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

2.22.1.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations.

2.22.1.4 **Excavations.**

2.22.1.4.1 Open trenches or excavations are not permitted within the RSA while the runway is open. Backfill trenches before the runway is opened. If backfilling excavations before the runway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

2.22.1.4.2 Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.1.5 **Erosion Control.**

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.2 Runway Object Free Area (ROFA).

Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

2.22.3 Taxiway Safety Area (TSA).

2.22.3.1 A taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. (See AC 150/5300-13.) Since the width of the TSA is equal to the wingspan of the design aircraft, no construction may occur within the TSA while the taxiway is open for aircraft operations. The TSA dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a TSA that is equal to the TSA width available during construction. Give special consideration to TSA dimensions at taxiway turns and intersections. (see AC 150/5300-13).

2.22.3.2 The airport operator must coordinate the adjustment of the TSA width as permitted above with the appropriate FAA Airports Regional or District Office and the FAA air traffic manager and issue a NOTAM.

2.22.3.3 The CSPP and SPCD must provide procedures for ensuring adequate distance for protection from blasting operations.

2.22.3.4 **Excavations.**

1. Curves. Open trenches or excavations are not permitted within the TSA while the taxiway is open. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.
2. Straight Sections. Open trenches or excavations are not permitted within the TSA while the taxiway is open for unrestricted aircraft operations. Trenches should be backfilled before the taxiway is opened. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations to allow the safe passage of ARFF equipment and of the heaviest aircraft operating on the taxiway across the trench without causing damage to the equipment or aircraft. In rare circumstances where the section of taxiway is indispensable for aircraft movement, open trenches or excavations may be permitted in the TSA while the taxiway is open to aircraft operations, subject to the following restrictions:
    a. Taxiing speed is limited to 10 mph.
    b. Appropriate NOTAMs are issued.
    c. Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.
    d. Low mass, low-profile lighted barricades are installed.
    e. Appropriate temporary orange construction signs are installed.
3. Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.22.3.5 **Erosion control.**

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

2.22.4 Taxiway Object Free Area (TOFA).

Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent. Except as provided below, no construction may occur within the taxiway object free area while the taxiway is open for aircraft operations.

2.22.4.1 The taxiway object free area dimensions may be temporarily adjusted if the taxiway is restricted to aircraft operations requiring a taxiway object free area that is equal to the taxiway object free area width available. Give special consideration to TOFA dimensions at taxiway turns and intersections.

2.22.4.2 Offset taxiway centerline and edge pavement markings (do not use glass beads) may be used as a temporary measure to provide the required taxiway object free area. Where offset taxiway pavement markings are provided, centerline lighting, centerline reflectors, or taxiway edge reflectors are required. Existing lighting that does not coincide with the temporary markings must be taken out of service.

2.22.4.3 Construction activity, including open excavations, may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:

2.22.4.3.1 Taxiing speed is limited to 10 mph.

2.22.4.3.2 NOTAMs issued advising taxiing pilots of hazard and recommending reduced taxiing speeds on the taxiway.

2.22.4.3.3 Marking and lighting meeting the provisions of paragraphs 2.18 and 2.20 are implemented.

2.22.4.3.4 If desired, appropriate orange construction signs are installed. See paragraph 2.18.4.2 and Appendix F.

2.22.4.3.5 Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the usable pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.

2.22.4.3.6 Flaggers furnished by the contractor must be used to direct and control construction equipment and personnel to a pre-established setback distance for safe passage of aircraft, and airline and/or airport personnel. Flaggers must also be used to direct taxiing aircraft. Due to liability issues, the airport operator should require airlines to provide flaggers for directing taxiing aircraft.

2.22.5 Obstacle Free Zone (OFZ).

In general, personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. If a penetration to the OFZ is necessary, it may be possible to continue aircraft operations through operational restrictions. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6 Runway Approach/Departure Areas and Clearways.

All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in AC 150/5300-13. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

2.22.6.1 Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

2.22.6.2 **Caution About Partial Runway Closures.**

When filing a NOTAM for a partial runway closure, clearly state that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold). There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition).

2.22.6.3 **Caution About Displaced Thresholds.**

Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, or other work within the existing RSA of any usable runway end, do not implement a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

2.23 **Other Limitations on Construction.**

The CSPP must specify any other limitations on construction, including but not limited to:

2.23.1 Prohibitions.

2.23.1.1 No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.

2.23.1.2 No use of open flame welding or torches unless fire safety precautions are provided and the airport operator has approved their use.

2.23.1.3 No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property. See AC 150/5370-10.

2.23.2 Restrictions.

2.23.2.1 Construction suspension required during specific airport operations.

2.23.2.2 Areas that cannot be worked on simultaneously.

2.23.2.3 Day or night construction restrictions.

2.23.2.4 Seasonal construction restrictions.

2.23.2.5 Temporary signs not approved by the airport operator.

2.23.2.6 Grades changes that could result in unplanned effects on NAVAIDs.

CHAPTER 3. GUIDELINES FOR WRITING A CSPP

3.1 General Requirements.

The CSPP is a standalone document written to correspond with the subjects outlined in paragraph 2.4. The CSPP is organized by numbered sections corresponding to each subject listed in paragraph 2.4, and described in detail in paragraphs 2.5 - 2.23. Each section number and title in the CSPP matches the corresponding subject outlined in paragraph 2.4 (for example, 1. Coordination, 2. Phasing, 3. Areas and Operations Affected by the Construction Activity, and so on). With the exception of the project scope of work outlined in Section 2. Phasing, only subjects specific to operational safety during construction should be addressed.

3.2 Applicability of Subjects.

Each section should, to the extent practical, focus on the specific subject. Where an overlapping requirement spans several sections, the requirement should be explained in detail in the most applicable section. A reference to that section should be included in all other sections where the requirement may apply. For example, the requirement to protect existing underground FAA ILS cables during trenching operations could be considered FAA ATO coordination (Coordination, paragraph 2.5.3), an area and operation affected by the construction activity (Areas and Operations Affected by the Construction Activity, paragraph 2.7.1.4), a protection of a NAVAID (Protection of Navigational Aids (NAVAIDs), paragraph 2.8), or a notification to the FAA of construction activities (Notification of Construction Activities, paragraph 2.13.5.3.2). However, it is more specifically an underground utility requirement (Underground Utilities, paragraph 2.15). The procedure for protecting underground ILS cables during trenching operations should therefore be described in 2.4.2.11: "The contractor must coordinate with the local FAA System Support Center (SSC) to mark existing ILS cable routes along Runway 17-35. The ILS cables will be located by hand digging whenever the trenching operation moves within 10 feet of the cable markings." All other applicable sections should include a reference to 2.4.2.11: "ILS cables shall be identified and protected as described in 2.4.2.11" or "See 2.4.2.11 for ILS cable identification and protection requirements." Thus, the CSPP should be considered as a whole, with no need to duplicate responses to related issues.

3.3 Graphical Representations.

Construction safety drawings should be included in the CSPP as attachments. When other graphical representations will aid in supporting written statements, the drawings, diagrams, and/or photographs should also be attached to the CSPP. References should be made in the CSPP to each graphical attachment and may be made in multiple sections.

3.4 **Reference Documents.**

The CSPP must not incorporate a document by reference unless reproduction of the material in that document is prohibited. In that case, either copies of or a source for the referenced document must be provided to the contractor. Where this AC recommends references (e.g. as in paragraph 3.9) the intent is to include a reference to the corresponding section in the CSPP, not to this Advisory Circular.

3.5 **Restrictions.**

The CSPP should not be considered as a project design review document. The CSPP should also avoid mention of permanent ("as-built") features such as pavements, markings, signs, and lighting, except when such features are intended to aid in maintaining operational safety during the construction.

3.6 **Coordination.**

Include in this section a detailed description of conferences and meetings to be held both before and during the project. Include appropriate information from AC 150/5370-12. Discuss coordination procedures and schedules for each required FAA ATO Technical Operations shutdown and restart and all required flight inspections.

3.7 **Phasing.**

Include in this section a detailed scope of work description for the project as a whole and each phase of work covered by the CSPP. This includes all locations and durations of the work proposed. Attach drawings to graphically support the written scope of work. Detail in this section the sequenced phases of the proposed construction. Include a reference to paragraph 3.8, as appropriate.

3.8 **Areas and Operations Affected by Construction.**

Focus in this section on identifying the areas and operations affected by the construction. Describe corresponding mitigation that is not covered in detail elsewhere in the CSPP. Include references to paragraphs below as appropriate. Attach drawings as necessary to graphically describe affected areas and mechanisms proposed. See Appendix F for sample operational effects tables and figures.

3.9 **NAVAID Protection.**

List in this section all NAVAID facilities that will be affected by the construction. Identify NAVAID facilities that will be placed out of service at any time prior to or during construction activities. Identify individuals responsible for coordinating each shutdown and when each facility will be out of service. Include a reference to paragraph 3.6 for FAA ATO NAVAID shutdown, restart, and flight inspection coordination. Outline in detail procedures to protect each NAVAID facility remaining in service from interference by construction activities. Include a reference to paragraph 3.14 for the

issuance of NOTAMs as required. Include a reference to paragraph 3.16 for the protection of underground cables and piping serving NAVAIDs. If temporary visual aids are proposed to replace or supplement existing facilities, include a reference to paragraph 3.19. Attach drawings to graphically indicate the affected NAVAIDS and the corresponding critical areas.

3.10 **Contractor Access.**

This will necessarily be the most extensive section of the CSPP. Provide sufficient detail so that a contractor not experienced in working on airports will understand the unique restrictions such work will require. Due to this extent, it should be broken down into subsections as described below:

3.10.1 Location of Stockpiled Construction Materials.

Describe in this section specific locations for stockpiling material. Note any height restrictions on stockpiles. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify stockpiles. Include a reference to paragraph 3.11 for provisions to prevent stockpile material from becoming wildlife attractants. Include a reference to paragraph 3.12 for provisions to prevent stockpile material from becoming FOD. Attach drawings to graphically indicate the stockpile locations.

3.10.2 Vehicle and Pedestrian Operations.

While there are many items to be addressed in this major subsection of the CSPP, all are concerned with one main issue: keeping people and vehicles from areas of the airport where they don't belong. This includes preventing unauthorized entry to the AOA and preventing the improper movement of pedestrians or vehicles on the airport. In this section, focus on mechanisms to prevent construction vehicles and workers traveling to and from the worksite from unauthorized entry into movement areas. Specify locations of parking for both employee vehicles and construction equipment, and routes for access and haul roads. In most cases, this will best be accomplished by attaching a drawing. Quote from AC 150/5210-5 specific requirements for contractor vehicles rather than referring to the AC as a whole, and include special requirements for identifying HAZMAT vehicles. Quote from, rather than incorporate by reference, AC 150/5210-20 as appropriate to address the airport's rules for ground vehicle operations, including its training program. Discuss the airport's recordkeeping system listing authorized vehicle operators.

3.10.3 Two-Way Radio Communications.

Include a special section to identify all individuals who are required to maintain communications with Air Traffic (AT) at airports with active towers, or monitor CTAF at airports without or with closed ATCT. Include training requirements for all individuals required to communicate with AT. Individuals required to monitor AT frequencies should also be identified. If construction employees are also required to communicate by radio with Airport Operations, this procedure should be described in detail. Usage of vehicle mounted radios and/or portable radios should be addressed. Communication procedures for the event of disabled radio communication (that is, light

signals, telephone numbers, others) must be included. All radio frequencies should by identified (Tower, Ground Control, CTAF, UNICOM, ATIS, and so on).

3.10.4 Airport Security.

Address security as it applies to vehicle and pedestrian operations. Discuss TSA requirements, security badging requirements, perimeter fence integrity, gate security, and other needs. Attach drawings to graphically indicate secured and/or Security Identification Display Areas (SIDA), perimeter fencing, and available access points.

3.11 Wildlife Management.

Discuss in this section wildlife management procedures. Describe the maintenance of existing wildlife mitigation devices, such as perimeter fences, and procedures to limit wildlife attractants. Include procedures to notify Airport Operations of wildlife encounters. Include a reference to paragraph 3.10 for security (wildlife) fence integrity maintenance as required.

3.12 FOD Management.

In this section, discuss methods to control and monitor FOD: worksite housekeeping, ground vehicle tire inspections, runway sweeps, and so on. Include a reference to paragraph 3.15 for inspection requirements as required.

3.13 HAZMAT Management.

Describe in this section HAZMAT management procedures: fuel deliveries, spill recovery procedures, Safety Data Sheet (SDS), Material Safety Data Sheet (MSDS) or Product Safety Data Sheet (PSDS) availability, and other considerations. Any specific airport HAZMAT restrictions should also be identified. Include a reference to paragraph 3.10 for HAZMAT vehicle identification requirements. Quote from, rather than incorporate by reference, AC 150/5320-15.

3.14 Notification of Construction Activities.

List in this section the names and telephone numbers of points of contact for all parties affected by the construction project. We recommend a single list that includes all telephone numbers required under this section. Include emergency notification procedures for all representatives of all parties potentially impacted by the construction. Identify individual representatives – and at least one alternate – for each party. List both on-duty and off-duty contact information for each individual, including individuals responsible for emergency maintenance of airport construction hazard lighting and barricades. Describe procedures to coordinate immediate response to events that might adversely affect the operational safety of the airport (such as interrupted NAVAID service). Explain requirements for and the procedures for the issuance of Notices to Airmen (NOTAMs), notification to FAA required by 14 CFR Part 77 and Part 157 and in the event of affected NAVAIDs. For NOTAMs, identify an individual, and at least one alternate, responsible for issuing and cancelling each specific type of Notice to

Airmen (NOTAM) required. Detail notification methods for police, fire fighting, and medical emergencies. This may include 911, but should also include direct phone numbers of local police departments and nearby hospitals. Identify the E911 address of the airport and the emergency access route via haul roads to the construction site. Require the contractor to have this information available to all workers. The local Poison Control number should be listed. Procedures regarding notification of Airport Operations and/or the ARFF Department of such emergencies should be identified, as applicable. If airport radio communications are identified as a means of emergency notification, include a reference to paragraph 3.10. Differentiate between emergency and nonemergency notification of ARFF personnel, the latter including activities that affect ARFF water supplies and access roads. Identify the primary ARFF contact person and at least one alternate. If notification is to be made through Airport Operations, then detail this procedure. Include a method of confirmation from the ARFF department.

3.15 **Inspection Requirements.**

Describe in this section inspection requirements to ensure airfield safety compliance. Include a requirement for routine inspections by the resident engineer (RE) or other airport operator's representative and the construction contractors. If the engineering consultants and/or contractors have a Safety Officer who will conduct such inspections, identify this individual. Describe procedures for special inspections, such as those required to reopen areas for aircraft operations. Part 139 requires daily airfield inspections at certificated airports, but these may need to be more frequent when construction is in progress. Discuss the role of such inspections on areas under construction. Include a requirement to immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

3.16 **Underground Utilities.**

Explain how existing underground utilities will be located and protected. Identify each utility owner and include contact information for each company/agency in the master list. Address emergency response procedures for damaged or disrupted utilities. Include a reference to paragraph 3.14 for notification of utility owners of accidental utility disruption as required.

3.17 **Penalties.**

Describe in this section specific penalties imposed for noncompliance with airport rules and regulations, including the CSPP: SIDA violations, VPD, and others.

3.18 **Special Conditions.**

Identify any special conditions that may trigger specific safety mitigation actions outlined in this CSPP: low visibility operations, snow removal, aircraft in distress, aircraft accident, security breach, VPD, and other activities requiring construction suspension/resumption. Include a reference to paragraph 3.10 for compliance with airport safety and security measures and for radio communications as required. Include

a reference to paragraph 3.14 for emergency notification of all involved parties, including police/security, ARFF, and medical services.

3.19 **Runway and Taxiway Visual Aids.**

Include marking, lighting, signs, and visual NAVAIDS. Detail temporary runway and taxiway marking, lighting, signs, and visual NAVAIDs required for the construction. Discuss existing marking, lighting, signs, and visual NAVAIDs that are temporarily, altered, obliterated, or shut down. Consider non-federal facilities and address requirements for reimbursable agreements necessary for alteration of FAA facilities and for necessary flight checks. Identify temporary TORA signs or runway distance remaining signs if appropriate. Identify required temporary visual NAVAIDs such as REIL or PAPI. Quote from, rather than incorporate by reference, AC 150/5340-1, *Standards for Airport Markings;* AC 150/5340-18, *Standards for Airport Sign Systems;* and AC 150/5340-30, as required. Attach drawings to graphically indicate proposed marking, lighting, signs, and visual NAVAIDs.

3.20 **Marking and Signs for Access Routes.**

Detail plans for marking and signs for vehicle access routes. To the extent possible, signs should be in conformance with the Federal Highway Administration MUTCD and/or State highway specifications, not hand lettered. Detail any modifications to the guidance in the MUTCD necessary to meet frangibility/height requirements.

3.21 **Hazard Marking and Lighting.**

Specify all marking and lighting equipment, including when and where each type of device is to be used. Specify maximum gaps between barricades and the maximum spacing of hazard lighting. Identify one individual and at least one alternate responsible for maintenance of hazard marking and lighting equipment in the master telephone list. Include a reference to paragraph 3.14. Attach drawings to graphically indicate the placement of hazard marking and lighting equipment.

3.22 **Work Zone Lighting for Nighttime Construction.**

If work is to be conducted at night, specify all lighting equipment, including when and where each type of device is to be used. Indicate the direction lights are to be aimed and any directions that aiming of lights is prohibited. Specify any shielding necessary in instances where aiming is not sufficient to prevent interference with air traffic control and aircraft operations. Attach drawings to graphically indicate the placement and aiming of lighting equipment. Where the plan only indicates directions that aiming of lights is prohibited, the placement and positioning of portable lights must be proposed by the Contractor and approved by the airport operator’s representative each time lights are relocated or repositioned.

3.23 **Protection of Runway and Taxiway Safety Areas.**

This section should focus exclusively on procedures for protecting all safety areas, including those altered by the construction: methods of demarcation, limit of access, movement within safety areas, stockpiling and trenching restrictions, and so on. Reference AC 150/5300-13, as required. Include a reference to paragraph 3.10 for procedures regarding vehicle and personnel movement within safety areas. Include a reference to paragraph 3.10 for material stockpile restrictions as required. Detail requirements for trenching, excavations, and backfill. Include a reference to paragraph 3.21 for hazard marking and lighting devices used to identify open excavations as required. If runway and taxiway closures are proposed to protect safety areas, or if temporary displaced thresholds and/or revised declared distances are used to provide the required Runway Safety Area, include a reference to paragraphs 3.14 and 3.19. Detail procedures for protecting the runway OFZ, runway OFA, taxiway OFA and runway approach surfaces including those altered by the construction: methods of demarcation, limit of cranes, storage of equipment, and so on. Quote from, rather than incorporate by reference, AC 150/5300-13, as required. Include a reference to paragraph 3.24 for height (i.e., crane) restrictions as required. One way to address the height of equipment that will move during the project is to establish a three-dimensional "box" within which equipment will be confined that can be studied as a single object. Attach drawings to graphically indicate the safety area, OFZ, and OFA boundaries.

3.24 **Other Limitations on Construction.**

This section should describe what limitations must be applied to each area of work and when each limitation will be applied: limitations due to airport operations, height (i.e., crane) restrictions, areas which cannot be worked at simultaneously, day/night work restrictions, winter construction, and other limitations. Include a reference to paragraph 3.7 for project phasing requirements based on construction limitations as required.

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APPENDIX A. RELATED READING MATERIAL

Obtain the latest version of the following free publications from the FAA on its Web site at http://www.faa.gov/airports/.

Table A-1. FAA Publications

Number	Title and Description
AC 150/5200-28	*Notices to Airmen (NOTAMs) for Airport Operators* Guidance for using the NOTAM System in airport reporting.
AC 150/5200-30	*Airport Field Condition Assessments and Winter Operations Safety* Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
AC 150/5200-33	*Hazardous Wildlife Attractants On or Near Airports* Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
AC 150/5210-5	*Painting, Marking, and Lighting of Vehicles Used on an Airport* Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
AC 150/5210-20	*Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports* Guidance to airport operators on developing ground vehicle operation training programs.
AC 150/5300-13	*Airport Design* FAA standards and recommendations for airport design. Establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
AC 150/5210-24	*Airport Foreign Object Debris (FOD) Management* Guidance for developing and managing an airport foreign object debris (FOD) program

Number	Title and Description
AC 150/5320-15	*Management of Airport Industrial Waste* Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.
AC 150/5340-1	*Standards for Airport Markings* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5340-18	*Standards for Airport Sign Systems* FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5345-28	*Precision Approach Path Indicator (PAPI) Systems* FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.
AC 150/5340-30	*Design and Installation Details for Airport Visual Aids* Guidance and recommendations on the installation of airport visual aids.
AC 150/5345-39	*Specification for L-853, Runway and Taxiway Retroreflective Markers*
AC 150/5345-44	*Specification for Runway and Taxiway Signs* FAA specifications for unlighted and lighted signs for taxiways and runways.
AC 150/5345-53	*Airport Lighting Equipment Certification Program* Details on the Airport Lighting Equipment Certification Program (ALECP).
AC 150/5345-50	*Specification for Portable Runway and Taxiway Lights* FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.
AC 150/5345-55	*Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure*

Number	Title and Description
AC 150/5370-10	*Standards for Specifying Construction of Airports* Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
AC 150/5370-12	*Quality Management for Federally Funded Airport Construction Projects*
EB 93	*Guidance for the Assembly and Installation of Temporary Orange Construction Signs*
FAA Order 5200.11	FAA Airports (ARP) Safety Management System (SMS) Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	*Grasses Attractive to Hazardous Wildlife* Guidance on grass management and seed selection.
FAA Form 7460-1	Notice of Proposed Construction or Alteration
FAA Form 7480-1	Notice of Landing Area Proposal
FAA Form 6000.26	National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at http://www.ecfr.gov/.

Table A-2. Code of Federal Regulation

Number	Title
Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at http://mutcd.fhwa.dot.gov/.

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APPENDIX B. TERMS AND ACRONYMS

Table B-1. Terms and Acronyms

Term	Definition
Form 7460-1	Notice of Proposed Construction or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. (See guidance available on the FAA web site at https://oeaaa.faa.gov.) The form may be downloaded at http://www.faa.gov/airports/resources/forms/, or filed electronically at: https://oeaaa.faa.gov.
Form 7480-1	Notice of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport The form may be downloaded at http://www.faa.gov/airports/resources/forms/.
Form 6000-26	Airport Sponsor Strategic Event Submission Form
AC	Advisory Circular
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Air Operations Area, as defined in 14 CFR Part 107. Means a portion of an airport, specified in the airport security program, in which security measures are carried out. This area includes aircraft movement areas, aircraft parking areas, loading ramps, and safety areas, and any adjacent areas (such as general aviation areas) that are not separated by adequate security systems, measures, or procedures. This area does not include the secured area of the airport terminal building.
ARFF	Aircraft Rescue and Fire Fighting
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
AT	Air Traffic
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under

Term	Definition
	the authority of 14 CFR Part 139, *Certification of Airports*.
CFR	Code of Federal Regulations
Construction	The presence of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
CSPP	Construction Safety and Phasing Plan. The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FOD	Foreign Object Debris/Damage
FSS	Flight Service Station
GA	General Aviation
HAZMAT	Hazardous Materials
HMA	Hot Mix Asphalt
IAP	Instrument Approach Procedures
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LDA	Landing Distance Available
LOC	Localizer antenna array
Movement Area	The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.

Term	Definition
NOTAM	Notices to Airmen
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OCC	Operations Control Center
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See AC 150/5300-13 for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to AC 150/5300-13 for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
OTS	Out of Service
P&R	Planning and Requirements Group
NPI	NAS Planning & Integration
PAPI	Precision Approach Path Indicator
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicator
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RA	Reimbursable Agreement
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.
SDS	Safety Data Sheet
SIDA	Security Identification Display Area
SMS	Safety Management System

Term	Definition
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
SSC	System Support Center
Taxiway Safety Area	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See AC 150/5300-13 for guidance on declared distances.
TSA	Taxiway Safety Area, or Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicator
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicator (PAPI), visual approach slope indicator (VASI), and pulse light approach slope indicator (PLASI).
VFR	Visual Flight Rules
VOR	Very High Frequency Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation

APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	2.5				
Operational safety is a standing agenda item for construction progress meetings.	2.5				
Scheduling of the construction phases is properly addressed.	2.6				
Any formal agreements are established.	2.5.3				
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	2.7.1				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	2.7.1.1				
Access routes used by ARFF vehicles affected by the project are addressed.	2.7.1.2				
Access routes used by airport and airline support vehicles affected by the project are addressed.	2.7.1.3				
Underground utilities, including water supplies for firefighting and drainage.	2.7.1.4				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	2.7.1.5				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	2.7.1				
Temporary changes to taxi operations are addressed.	2.7.2.1				
Detours for ARFF and other airport vehicles are identified.	2.7.2.2				
Maintenance of essential utilities and underground infrastructure is addressed.	2.7.2.3				
Temporary changes to air traffic control procedures are addressed.	2.7.2.4				
NAVAIDs					
Critical areas for NAVAIDs are depicted on drawings.	2.8				
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	2.8				
Protection of NAVAID facilities is addressed.	2.8				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	2.8				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	2.8, 2.13.1, 2.13.5.3.1, 2.18.1				
Contractor Access					
The CSPP addresses areas to which contractor will have access and how	2.9				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	2.9				
The location of stockpiled construction materials is depicted on drawings.	2.9.1				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	2.9.1				
Requirements for proper stockpiling of materials are included.	2.9.1				
Construction site parking is addressed.	2.9.2.1				
Construction equipment parking is addressed.	2.9.2.2				
Access and haul roads are addressed.	2.9.2.3				
A requirement for marking and lighting of vehicles to comply with AC 150/5210-5, *Painting, Marking and Lighting of Vehicles Used on an Airport,* is included.	2.9.2.4				
Proper vehicle operations, including requirements for escorts, are described.	2.9.2.5, 2.9.2.6				
Training requirements for vehicle drivers are addressed.	2.9.2.7				
Two-way radio communications procedures are described.	2.9.2.9				
Maintenance of the secured area of the airport is addressed.	2.9.2.10				
Wildlife Management					
The airport operator’s wildlife management procedures are addressed.	2.10				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator's FOD management procedures are addressed.	2.11				
Hazardous Materials Management					
The airport operator's hazardous materials management procedures are addressed.	2.12				
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	2.13				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	2.13.1				
A list of local ATO/Technical Operations personnel is included.	2.13.1				
A list of ATCT managers on duty is included.	2.13.1				
A list of authorized representatives to the OCC is included.	2.13.2				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	2.8, 2.13.2, 2.18.3.3.9				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	2.13.2				
Emergency notification procedures for medical, fire fighting, and police	2.13.3				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	2.13.4				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	2.13.5				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	2.13.5.3.2				
Inspection Requirements					
Daily and interim inspections by both the airport operator and contractor are specified.	2.14.1, 2.14.2				
Final inspections at certificated airports are specified when required.	2.14.3				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	2.15				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	2.16				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	2.17				
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	2.18.1				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with AC 150/5340-1, *Standards for Airport Markings*, is specified.	2.18.2				
Detailed specifications for materials and methods for temporary markings are provided.	2.18.2				
The requirement for lighting to conform to AC 150/5340-30, *Design and Installation Details for Airport Visual Aids;* AC 150/5345-50, *Specification for Portable Runway and Taxiway Lights;* and AC 150/5345-53, *Airport Lighting Certification Program*, is specified.	2.18.3				
The use of a lighted X is specified where appropriate.	2.18.2.1.2, 2.18.3.2				
The requirement for signs to conform to AC 150/5345-44, *Specification for Runway and Taxiway Signs;* AC 50/5340-18, *Standards for Airport Sign Systems;* and AC 150/5345-53, *Airport Lighting Certification Program*, is specified.	2.18.4				
Marking and Signs For Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to AC 150/5340-18 and, to the extent practicable, with the MUTCD and/or State highway specifications.	2.18.4.2				
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	2.20.1				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	2.20.1				
The CSPP considers less obvious construction-related hazards.	2.20.1				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	2.20.2.1				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	2.20.2.1				
Red lights meeting the luminance requirements of the State Highway Department are specified.	2.20.2.2				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	2.20.2.3				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	2.20.2.3				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	2.20.2.5				
Markings for temporary closures are specified.	2.20.2.5				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	2.20.2.7				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	2.21				
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	2.22.1.1, 2.22.3.1				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	2.22.1.2, 2.22.3.2				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	2.22.3.3				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	2.22.1.4				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	2.22.1.4				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	2.22.1.4				
Grading and soil erosion control to maintain RSA/TSA standards are	2.22.3.5				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	2.22.2				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	2.22.3				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	2.22.4				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	2.22.4.3.6				
Provisions for protection of runway approach/departure areas and clearways are included.	2.22.6				
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	2.23.1.2				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	2.23.1.3				

APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Item	Action Required (Describe)	No Action Required (Check)
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

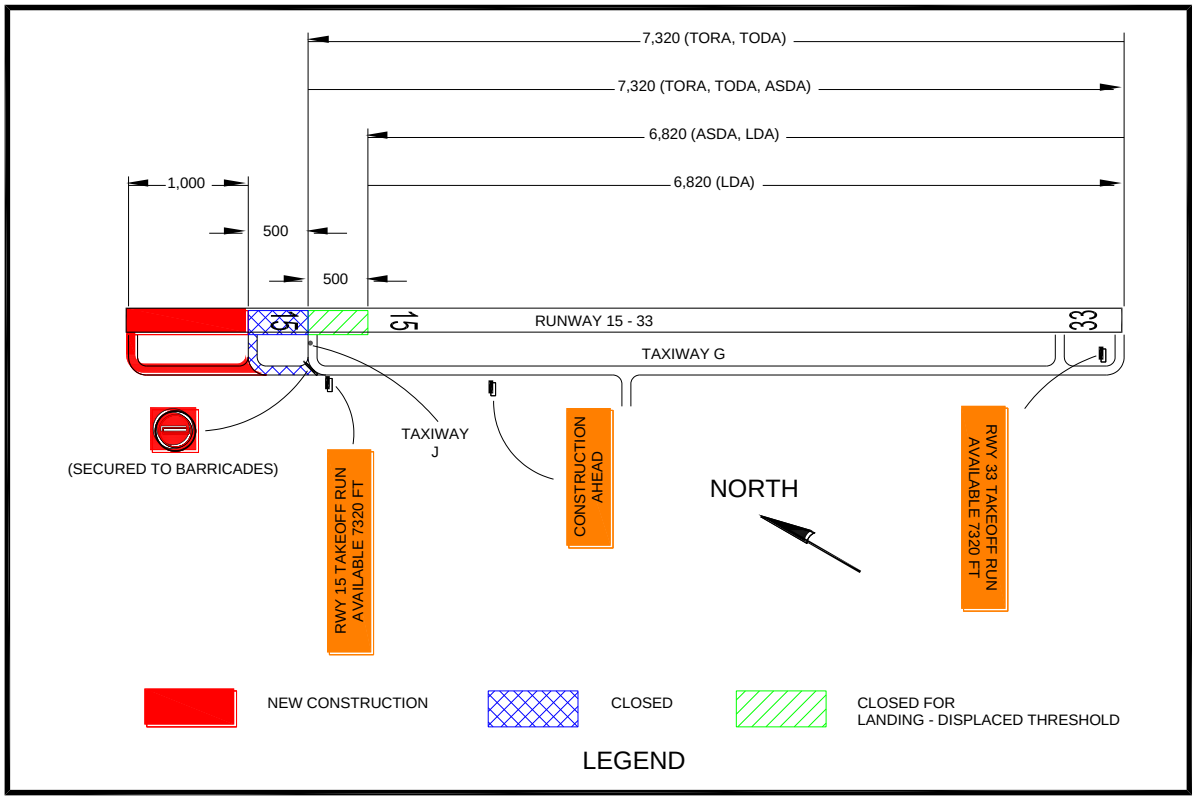
APPENDIX E. SAMPLE OPERATIONAL EFFECTS TABLE

E.1 **Project Description.**

Runway 15-33 is currently 7820 feet long, with a 500 foot stopway on the north end. This project will remove the stopway and extend the runway 1000 feet to the north and 500 feet to the south. Finally, the existing portion of the runway will be repaved. The runway 33 glide slope will be relocated. The new runway 33 localizer has already been installed by FAA Technical Operations and only needs to be switched on. Runway 15 is currently served only by a localizer, which will remain in operation as it will be beyond the future RSA. Appropriate NOTAMS will be issued throughout the project.

E.1.1 During Phase I, the runway 15 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 15 takeoff and the departure end of runway 33 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 33 will be adjusted to provide the required RSA and applicable departure surface. Excavation near Taxiway G will require its ADG to be reduced from IV to III. See Figure E-1.

Figure E-1. Phase I Example

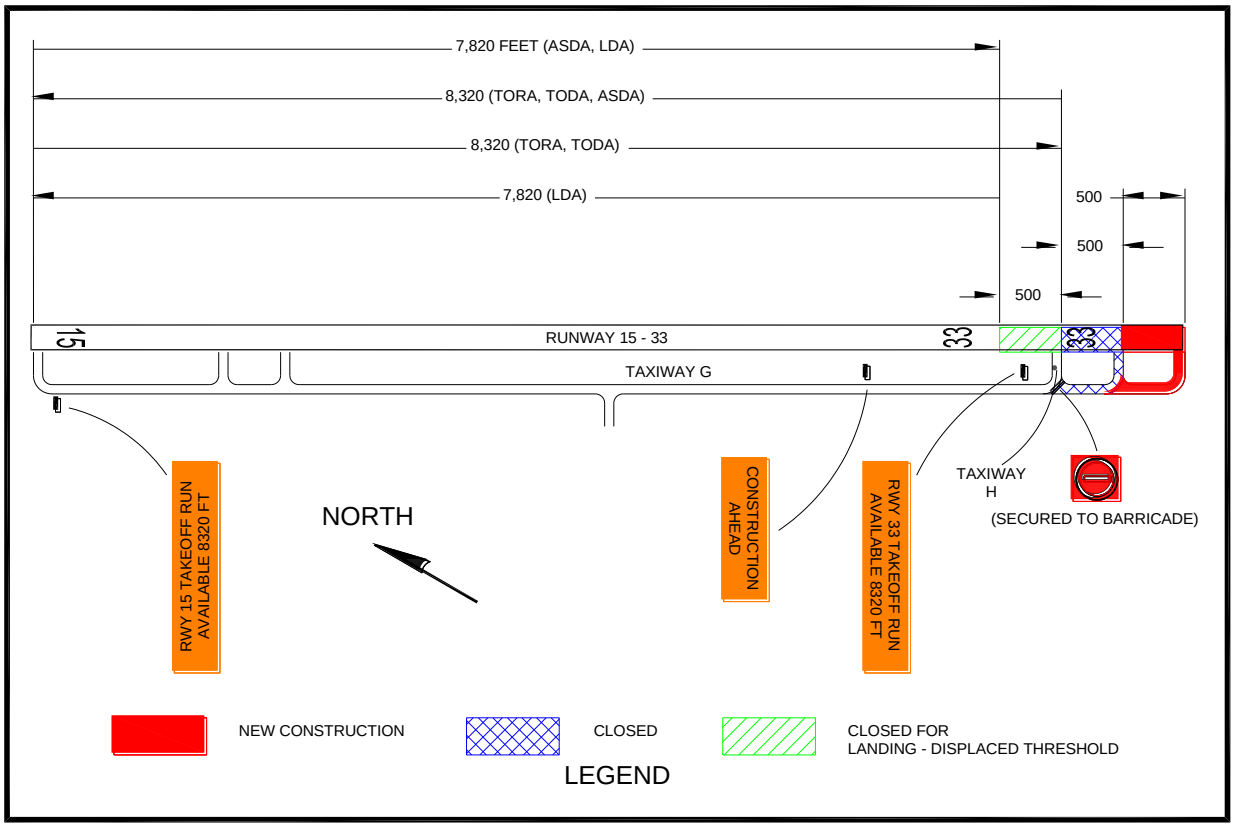


Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 33 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

E.2 During Phase II, the runway 33 threshold will be displaced 1000 feet to keep construction equipment below the approach surface. The start of runway 33 takeoff and the departure end of runway 15 will also be moved 500 feet to protect workers from jet blast. Declared distances for runway 15 will be adjusted to provide the required RSA and applicable departure surface. See Figure E-2.

Figure E-2. Phase II Example



Note 1: Where hold signs are installed on both sides of a taxiway, install the TORA sign on the left side of the taxiway before the final turn to the runway intersection.

Note 2: Based on the declared distances for Runway 15 departures, the maximum equipment height in the construction area is 12.5 feet (500/40 = 12.5).

E.3 During Phase III, the existing portion of the runway will be repaved with Hot Mix Asphalt (HMA) and the runway 33 glide slope will be relocated. Construction will be accomplished between the hours of 8:00 pm and 5:00 am, during which the runway will be closed to operations.

Figure E-3. Phase III Example

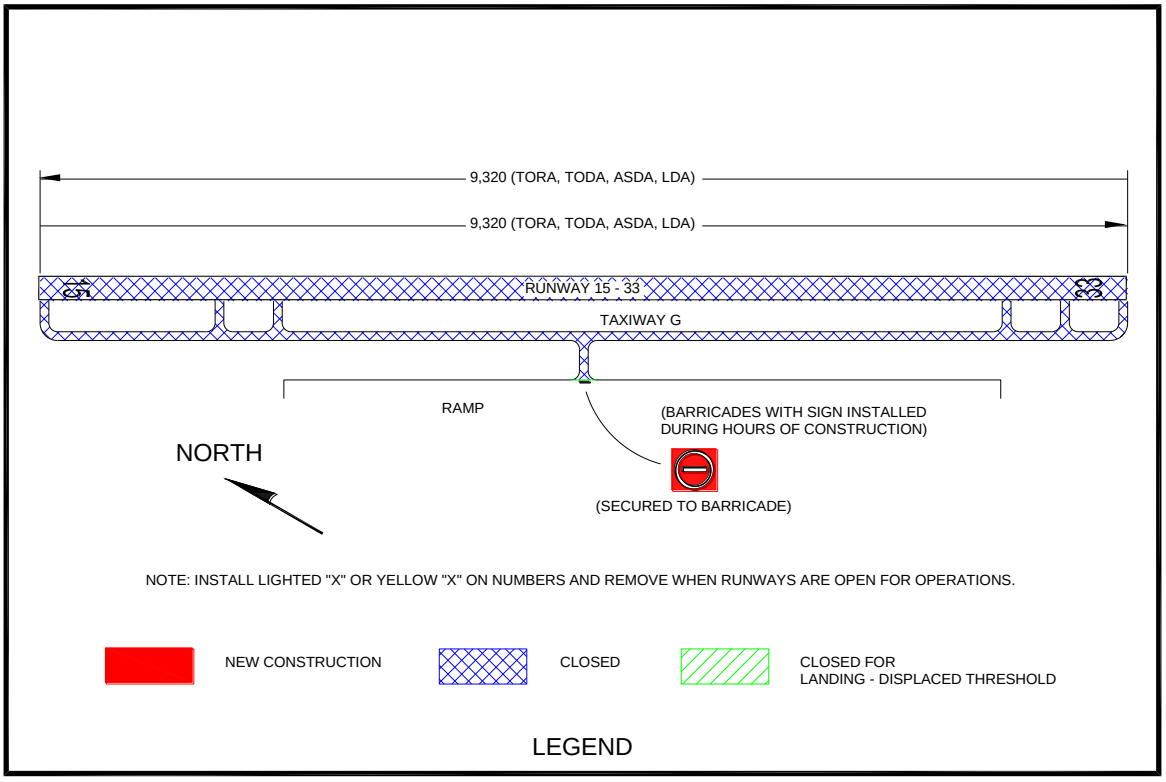


Table E-1. Operational Effects Table

Project	**Runway 15-33 Extension and Repaving**			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Scope of Work	N/A	Extend Runway 15-33 1,000 ft on north end with Hot Mix Asphaltic Concrete (HMA).	Extend Runway 15-33 500 ft on south end with Hot Mix Asphaltic Concrete (HMA).	Repave existing runway with HMA Relocate Runway 33 Glide Slope
Effects of Construction Operations	N/A	Existing North 500 ft closed	Existing South 500 ft closed	Runway closed between 8:00 pm and 5:00 am Edge lighting out of service
Construction Phase	N/A	Phase I (Anticipated)	Phase II (Anticipated)	Phase III (Anticipated)
Runway 15 Average Aircraft Operations	Carrier: 52 /day GA: 26 /day Military: 11 /day	Carrier: 40 /day GA: 26 /day Military: 0 /day	Carrier: 45 /day GA: 26 /day Military: 5 /day	Carrier: 45 / day GA: 20 / day Military: 0 /day
Runway 33 Average Aircraft Operations	Carrier: 40 /day GA: 18 /day Military: 10 /day	Carrier: 30 /day GA: 18 /day Military: 0 /day	Carrier: 25 /day GA: 18 /day Military: 5 /day	Carrier: 20 /day GA: 5 /day Military: 0 /day
Runway 15-33 Aircraft Category	C-IV	C-IV	C-IV	C-IV
Runway 15 Approach Visibility Minimums	1 mile	1 mile	1 mile	1 mile
Runway 33 Approach Visibility Minimums	¾ mile	¾ mile	¾ mile	1 mile

Note: Proper coordination with Flight Procedures group is necessary to maintain instrument approach procedures during construction.

Project		Runway 15-33 Extension and Repaving			
Phase		Normal (Existing)	Phase I: Extend Runway 15 End	Phase II: Extend Runway 33 End	Phase III: Repave Runway
Runway 15 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	7,820	7,320	7,820	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 33 Declared Distances	TORA	7,820	7,320	8,320	9,320
	TODA	7,820	7,320	8,320	9,320
	ASDA	8,320	6,820	8,320	9,320
	LDA	7,820	6,820	7,820	9,320
Runway 15 Approach Procedures		LOC only	LOC only	LOC only	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 33 Approach Procedures		ILS	ILS	ILS	LOC only
		RNAV	RNAV	RNAV	RNAV
		VOR	VOR	VOR	VOR
Runway 15 NAVAIDs		LOC	LOC	LOC	LOC
Runway 33 NAVAIDs		ILS, MALSR	ILS, MALSR	ILS, MALSR	LOC, MALSR
Taxiway G ADG		IV	III	IV	IV
Taxiway G TDG		4	4	4	4
ATCT (hours open)		24 hours	24 hours	24 hours	0500 - 2000
ARFF Index		D	D	D	D

Project	Runway 15-33 Extension and Repaving			
Phase	**Normal (Existing)**	**Phase I: Extend Runway 15 End**	**Phase II: Extend Runway 33 End**	**Phase III: Repave Runway**
Special Conditions	Air National Guard (ANG) military operations	All military aircraft relocated to alternate ANG Base	Some large military aircraft relocated to alternate ANG Base	All military aircraft relocated to alternate ANG Base
Information for NOTAMs		Refer above for applicable declared distances. Taxiway G limited to 118 ft wingspan	Refer above for applicable declared distances.	Refer above for applicable declared distances. Airport closed 2000 – 0500. Runway 15 glide slope OTS.

Note: This table is one example. It may be advantageous to develop a separate table for each project phase and/or to address the operational status of the associated NAVAIDs per construction phase.

Complete the following chart for each phase to determine the area that must be protected along the runway and taxiway edges:

Table E-2. Runway and Taxiway Edge Protection

Runway/Taxiway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	Safety Area Width in Feet Divided by 2*

*See AC 150/5300-13 to complete the chart for a specific runway/taxiway.

Complete the following chart for each phase to determine the area that must be protected before the runway threshold:

Table E-3. Protection Prior to Runway Threshold

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Distance to Threshold Based on Required Approach Slope*	
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1
			ft	ft	: 1

*See AC 150/5300-13 to complete the chart for a specific runway.

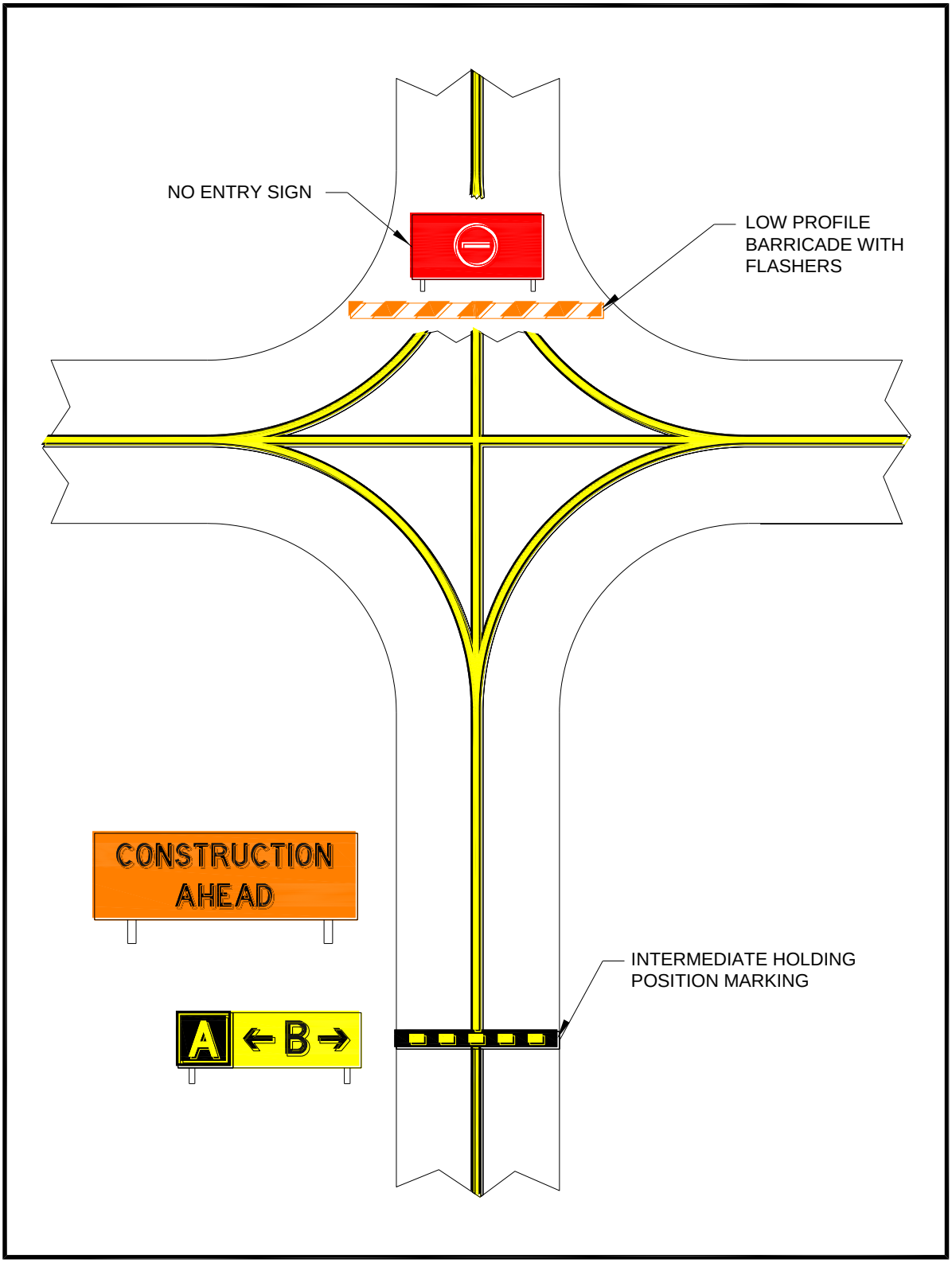
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APPENDIX F. ORANGE CONSTRUCTION SIGNS

Figure F-1. Approved Sign Legends

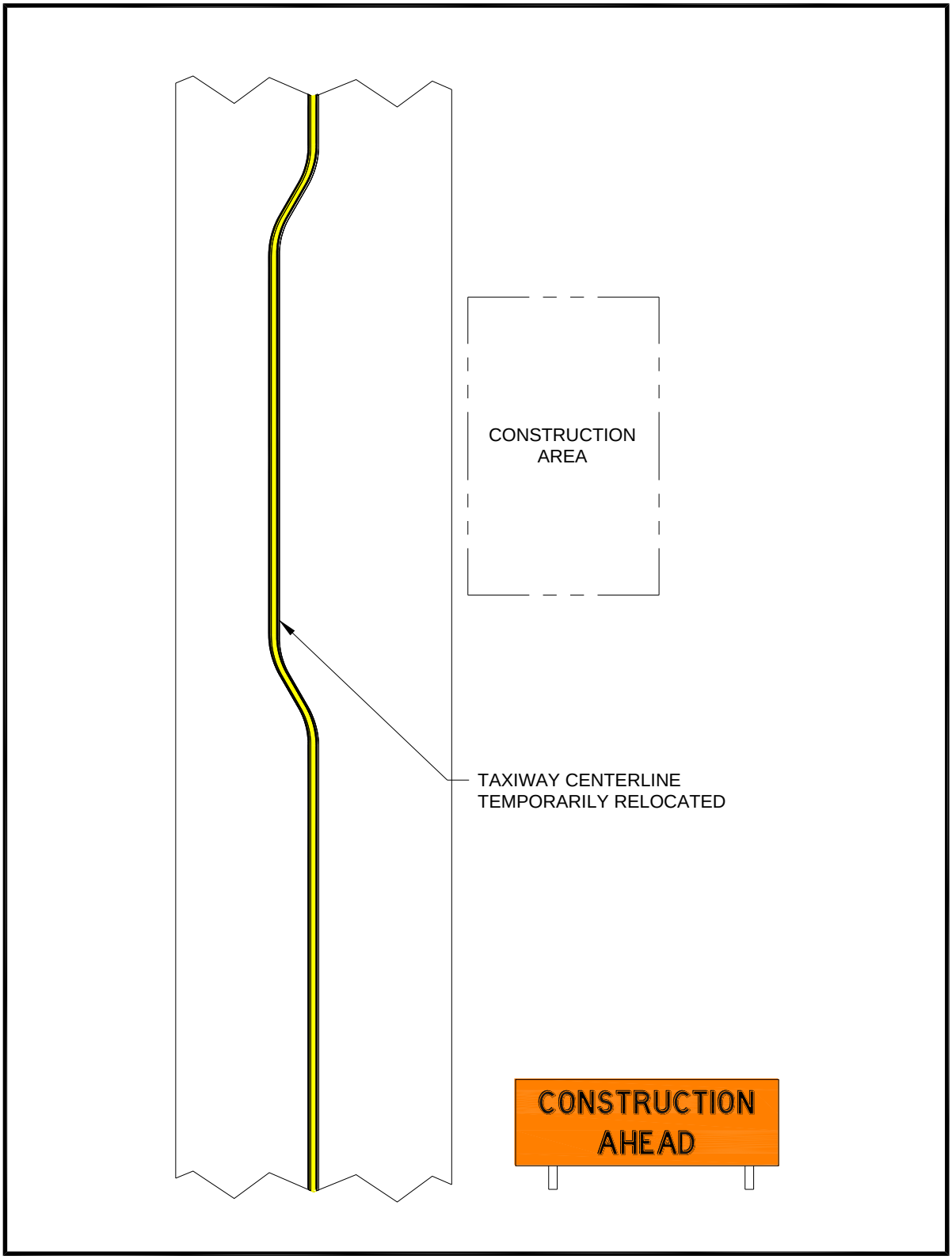


Figure F-2. Orange Construction Sign Example 1



Note: For proper placement of signs, refer to EB 93.

Figure F-3. Orange Construction Sign Example 2



Note: For proper placement of signs, refer to EB 93.

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Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5370-2G Date: _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____
_____
_____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

_____
_____
_____

☐ Other comments:

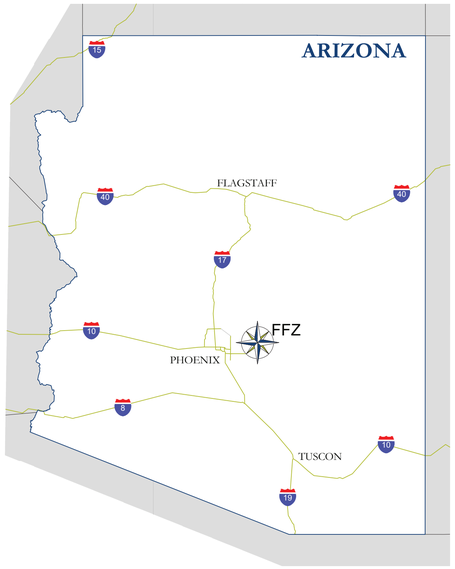
_____
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_____

☐ I would like to discuss the above. Please contact me at (phone number, email address).

_____

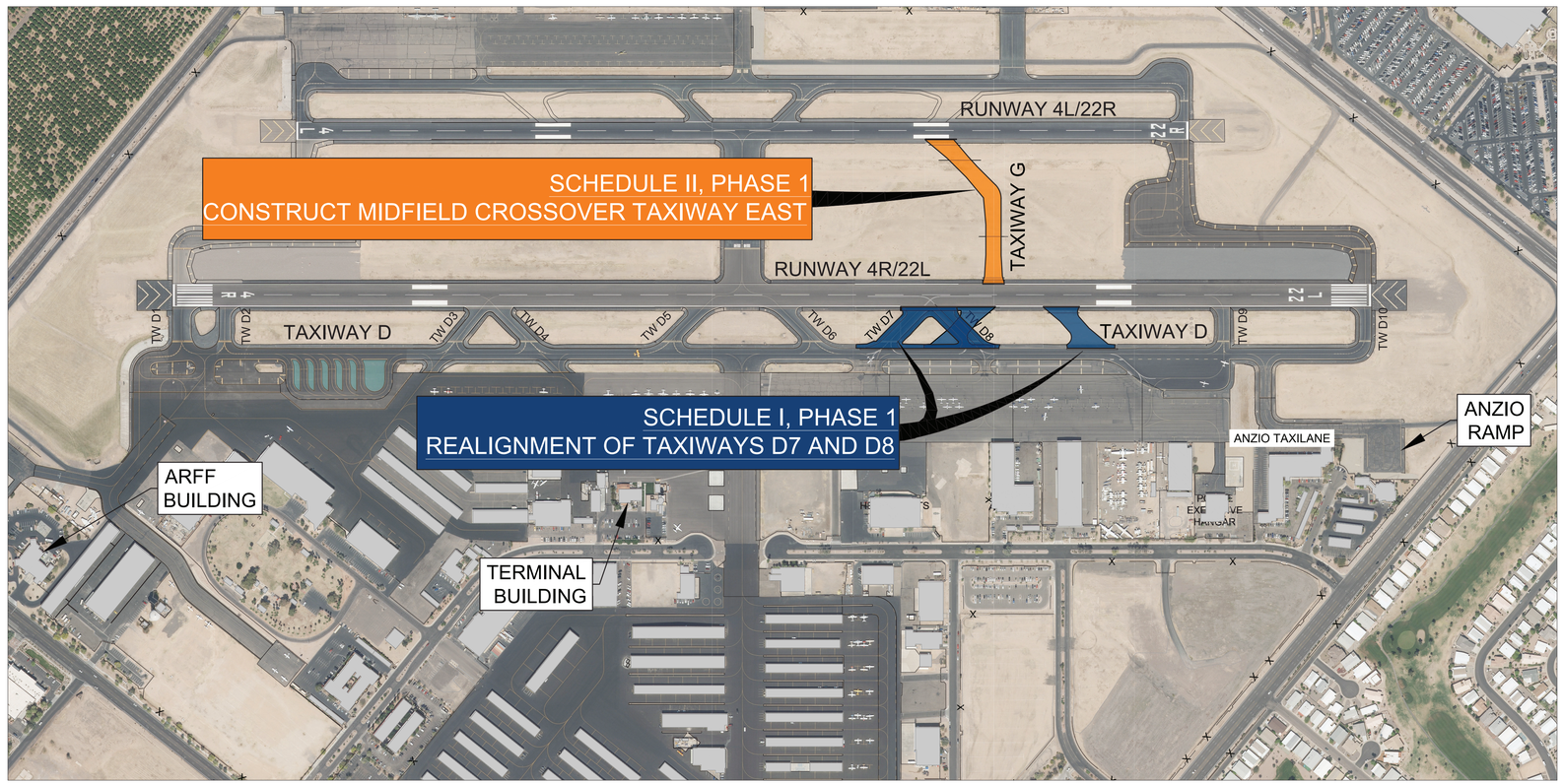
Submitted by: _____ Date: _____

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CONSTRUCTION PLANS FOR IMPROVEMENTS TO
FALCON FIELD AIRPORT
MESA, ARIZONA
A.I.P. PROJECT NO. 03-04-0023-035-2023
CITY OF MESA DESIGN PROJECT NO. CP0994EAST

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8



APPROVED COPY
CITY OF MESA: ENGINEERING DEPARTMENT
PLAN APPROVAL DOES NOT CONSTITUTE AN APPROVAL OR PERMIT FOR VIOLATION OF ANY PROVISIONS OF THE MAG UNIFORM STANDARD SPECIFICATIONS & DETAILS AS AMENDED BY THE CITY OF MESA.
BY: Kayleen Cichocki DATE: 03-31-2023

mesa·az
FALCON FIELD AIRPORT

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
in Maricopa County: (602) 263-1100

JVIATION
A WOOLPERT COMPANY
720 SOUTH COLORADO BOULEVARD
SUITE 1200-S
GLENDALE, COLORADO
PROJECT MANAGER: JON WEEKS
PHONE(MOBILE): (720) 413-6094
PHONE (OFFICE): (303) 524-3031
FAX: (303) 524-3031
jviaton.com

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

Mesa - Falcon Field Airport

• SCHEDULE I •
REALIGNMENT OF TAXIWAYS D7 AND D8

• SCHEDULE II •
CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST

• SCHEDULE III •
INSTALL AIRFIELD LIGHTING CONTROL AND MONITORING SYSTEM (ALCMS)

GRAPHIC SCALE
300 0 300 600
(IN FEET)
1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 59241 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

COVER SHEET

DRAWING G001

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 1 OF 52

CATALOG NUMBER: A-270520

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G001-COVR.DWG

INDEX OF DRAWINGS

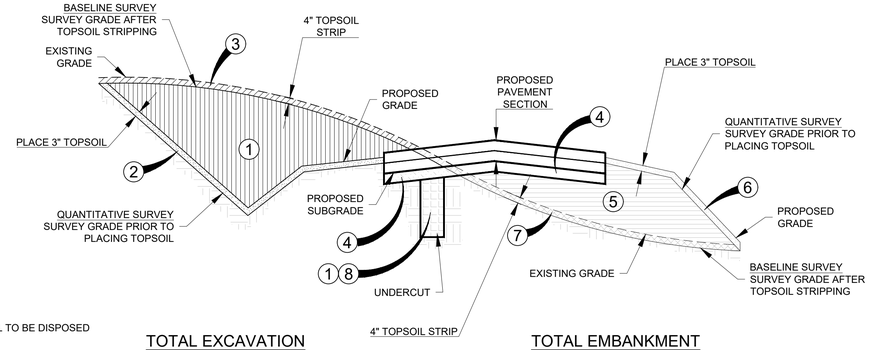
SHEET NO.	SHEET I.D.	SHEET DESCRIPTION
1	G001	COVER SHEET
2	G002	INDEX OF DRAWINGS AND SUMMARY OF APPROXIMATE QUANTITIES
3	G003	GENERAL NOTES
4	G004	MASTER LEGEND AND ABBREVIATIONS
5	G005	SURVEY CONTROL PLAN
6	G020	GEOTECHNICAL INVESTIGATION PLAN AND BORE LOG LOCATIONS
7	G021	GEOTECHNICAL INVESTIGATION BORE LOGS
8	G050	CONSTRUCTION SAFETY DRAWING OVERALL SCHEDULES AND PHASE PLAN
9	G051	CONSTRUCTION SAFETY PLAN SAFETY NOTES
10	G052	CONSTRUCTION SAFETY DRAWING SCHEDULE II, PHASE 1
11	G053	CONSTRUCTION SAFETY DRAWING SCHEDULE II, PHASE 2
12	G054	CONSTRUCTION SAFETY DRAWING SCHEDULE II, PHASE 3
13	G055	CONSTRUCTION SAFETY DRAWING SCHEDULE I, PHASE 4
14	G056	CONSTRUCTION SAFETY DRAWING SCHEDULE I, PHASE 5
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18	C102	DEMOLITION PLAN AREA 2 (SCHEDULE I)
19	C103	DEMOLITION PLAN AREA 3 (SCHEDULE I)
20	C201	GEOMETRY PLAN AREA 1 (SCHEDULE II)
21	C202	GEOMETRY PLAN AREA 2 (SCHEDULE I)
22	C203	GEOMETRY PLAN AREA 3 (SCHEDULE I)
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24	C301	GRADING AND DRAINAGE PLAN AREA 1 (SCHEDULE II)
25	C302	GRADING AND DRAINAGE PLAN AREA 2 (SCHEDULE I)
26	C303	GRADING AND DRAINAGE PLAN AREA 3 (SCHEDULE I)
27	C321	SPOT ELEVATION PLAN AREA 1 (SCHEDULE II)
28	C322	SPOT ELEVATION PLAN AREA 2 (SCHEDULE I)
29	C323	SPOT ELEVATION PLAN AREA 3 (SCHEDULE I)
30	C400	TAXIWAY G PLAN AND PROFILE
31	C401	TAXIWAYS D7 AND D8 PLAN AND PROFILES
32	C500	STORM PIPE PLAN AND PROFILE
33	C501	STORM PIPE PLAN AND PROFILE
34	C550	STORM DETAILS
35	C601	PAVEMENT MARKING PLAN AREA 1 (SCHEDULE II)
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50	E251	ELECTRICAL DETAILS
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SUMMARY OF ESTIMATED QUANTITIES

ITEM NO.	ITEM DESCRIPTION	UNITS	SCHEDULE I		SCHEDULE II		SCHEDULE II	
			ESTIMATE	AS BUILT	ESTIMATE	AS BUILT	ESTIMATE	AS BUILT
GP-50a	CONSTRUCTION SURVEY AND STAKING	LS	1		1		0	
GP-100a	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	LS	1		1		0	
GP-100b	FAA PAVING QC/QA WORKSHOP	LS	1		0		0	
GP-102a	AZPDES PERMIT COMPLIANCE AND SWPPP	LS	1		1		0	
GP-105a	MOBILIZATION	LS	1		1		1	
GTP-10a	EXISTING UTILITY LOCATES	LS	1		1		0	
GTP-20a	AIRFIELD TRAFFIC CONTROL AND BARRICADES	LS	1		1		0	
P-101a	SAWCUT ASPHALT PAVEMENT (4")	LF	1,370		230		0	
P-101b	SAWCUT ASPHALT PAVEMENT (2")	LF	135		65		0	
P-101c	ASPHALT PAVEMENT REMOVAL (FULL DEPTH, 4")	SY	3,300		0		0	
P-101d	ASPHALT PAVEMENT SHOULDER REMOVAL (FULL DEPTH, 2")	SY	3,255		440		0	
P-101e	ASPHALT PAVEMENT REMOVAL (PARTIAL DEPTH, 2")	SY	800		85		0	
P-101f	REMOVE STORM SEWER PIPE	LF	416		0		0	
P-101g	REMOVE INLET/OUTLET WITH GRATE	EA	2		0		0	
P-152a	UNCLASSIFIED EXCAVATION	CY	4,235		1,825		0	
P-152b	UNCLASSIFIED EXCAVATION FOR SUBGRADE (8" DEPTH)	CY	1,395		1,300		0	
P-152c	EMBANKMENT FOR UNDERCUT	CY	500		500		0	
P-208a	AGGREGATE BASE COURSE (10" THICK)	SY	3,550		3,480		0	
P-222a	SOIL STERILIZATION	SY	6,270		5,835		0	
P-401a	ASPHALT SURFACE COURSE (3/4", 4" THICK)	SY	3,425		3,325		0	
P-401b	ASPHALT SURFACE COURSE (3/4", 3" THICK)	SY	2,845		2,510		0	
P-401c	ASPHALT SURFACE COURSE (3/4", 2" THICK)	SY	795		85		0	
P-603a	EMULSIFIED ASPHALT TACK COAT	GAL	425		340		0	
P-620a	SURFACE PREPARATION (OBLITERATIONS)	SF	855		0		0	
P-620b	MARKING (TEMPORARY)	SF	13,785		4,520		0	
P-620c	MARKING (PERMANENT)	SF	13,785		4,520		0	
D-701a	23"X14" CLASS V RCP	LF	575		520		0	
D-710a	RIP RAP (D50=6", T=2') UNDERLAIN W/ FILTER FABRIC	CY	10		10		0	
D-751a	INLET STRUCTURE WITH GRATE	EA	4		4		0	
D-751b	OUTLET STRUCTURE WITH GRATE	EA	4		4		0	
T-901a	SEEDING WITH HYDROMULCH	AC	6		3		0	
L-108a	INSTALL #8 AWG L-824C, 5000V WIRE	LF	5,950		5,000		0	
L-108b	INSTALL #6 AWG, BARE COPPER COUNTERPOISE INCLUDING GROUND RODS AND TERMINATIONS	LF	5,400		4,000		0	
L-108c	INSTALL #10 AWG XHHW, 600V WIRE	LF	10,000		2,000		0	
L-110a	INSTALL 1-2" SCH 40 PVC CONDUIT (DEB)	LF	3,400		3,100		0	
L-110b	INSTALL 1-2" SCH 40 PVC CONDUIT (CE)	LF	450		300		0	
L-110c	INSTALL 2-2" SCH 40 PVC CONDUIT (DEB)	LF	900		325		0	
L-110d	INSTALL 2-2" SCH 40 PVC CONDUIT (CE)	LF	200		55		0	
L-110e	INSTALL 4-2" SCH 40 PVC CONDUIT (CE)	LF	260		75		0	
L-115a	REMOVE JUNCTION BOX, COMPLETE	EA	8		0		0	
L-115b	INSTALL L-867E JUNCTION BOX, COMPLETE	EA	8		3		0	
L-125a	REMOVE BASE MOUNTED RUNWAY/TAXIWAY LIGHT, COMPLETE	EA	31		1		0	
L-125b	REMOVE L-858 GUIDANCE SIGN, COMPLETE	EA	6		0		0	
L-125c	INSTALL L-861T LED TAXIWAY EDGE LIGHT, COMPLETE	EA	36		41		0	
L-125d	INSTALL L-861 LED RUNWAY EDGE LIGHT, COMPLETE	EA	1		1		0	
L-125e	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 2 MODULE, COMPLETE	EA	1		1		0	
L-125f	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 3 MODULE, COMPLETE	EA	4		0		0	
L-125g	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 4 MODULE, COMPLETE	EA	2		2		0	
L-125h	INSTALL L-804 LED RUNWAY GUARD LIGHT, COMPLETE	EA	4		4		0	
L-125i	INSTALL L-853 RETROREFLECTIVE MARKER, SURFACE MOUNTED, COMPLETE	EA	8		0		0	
L-125j	INSTALL L-890 ALCMS, COMPLETE	EA	0		0		1	
L-125k	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 1 MODULE, COMPLETE	EA	0		1		0	

EARTHWORK SUMMARY

AREA DESCRIPTION	CUT (CY)	FILL (CY)
SCHEDULE I		
UNCLASSIFIED EXCAVATION	3,735	625
UNCLASSIFIED EXCAVATION FOR UNDERCUT	500	500
P-152a UNCLASSIFIED EXCAVATION	4,235	
P-152B UNCLASSIFIED EXCAVATION FOR SUBGRADE	1,395	
P-152c EMBANKMENT FOR UNDERCUT		500
SCHEDULE II		
UNCLASSIFIED EXCAVATION	1,325	645
UNCLASSIFIED EXCAVATION FOR UNDERCUT	500	500
P-152a UNCLASSIFIED EXCAVATION	1,825	
P-152B UNCLASSIFIED EXCAVATION FOR SUBGRADE	1,300	
P-152c EMBANKMENT FOR UNDERCUT		500



NOTE:
1. EXCESS MATERIAL TO BE DISPOSED OFFSITE..

TOTAL EXCAVATION

1. UNCLASSIFIED EXCAVATION VOLUME (PAY)
2. TOPSOIL VOLUME AT EXCAVATION (PLACED) (NO PAY)
3. TOPSOIL VOLUME AT EXCAVATION (STRIPPED) (NO PAY)
4. UNCLASSIFIED EXCAVATION FOR SUBGRADE (PAY)

TOTAL EMBANKMENT

5. EMBANKMENT VOLUME (FROM ONSITE OR BORROW SOURCE) (NO PAY)
6. TOPSOIL VOLUME AT EMBANKMENT (PLACED) (NO PAY)
7. TOPSOIL VOLUME AT EMBANKMENT (STRIPPED) (NO PAY)
8. EMBANKMENT FOR UNDERCUT (PAY)

1 EARTHWORK CALCULATIONS DETAIL (EXCAVATION)
NOT TO SCALE

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

NOTES:

1. P-152a UNCLASSIFIED EXCAVATION QUANTITY INCLUDES THE REMOVAL OF EXISTING BASE MATERIAL AND SOIL BELOW THE EXISTING ASPHALT OR NATIVE SOIL TO REACH THE ELEVATION OF THE TOP OF SUBGRADE. ALSO INCLUDED IN THE UNCLASSIFIED EXCAVATION IS ANY UNDERCUT (OVEREXCAVATION) NECESSARY TO MITIGATE UNSUITABLE SUBGRADE MATERIAL. THE UNDERCUT QUANTITY WAS ASSUMED TO BE ONE FOOT OF MATERIAL OVER ONE-QUARTER OF THE PAVED TAXIWAY AND TAXIWAY SHOULDER AREA.
2. P-152b UNCLASSIFIED EXCAVATION FOR SUBGRADE QUANTITY INCLUDES THE PROCESSING AND COMPACTION OF THE 8" OF SUBGRADE DIRECTLY BELOW THE PROPOSED P-208 MATERIAL. AREAS THAT ARE REMOVED AS UNDERCUT AND REPLACED AS EMBANKMENT FOR UNDERCUT SHALL NOT ALSO RECEIVE PAY FOR P-152b.
3. P-152c EMBANKMENT FOR UNDERCUT QUANTITY REPRESENTS THE ASSUMED EMBANKMENT NECESSARY TO REPLACE UNSUITABLE SUBGRADE MATERIAL(UNDERCUT).
4. ANY UNSUITABLE MATERIAL OR UNCLASSIFIED EXCAVATION MATERIAL NOT USED IN UNDERCUT OR EMBANKMENT OPERATIONS SHALL BE REMOVED AND DISPOSED OF OFF SITE BY THE CONTRACTOR AND SHALL BE INCIDENTAL TO P-152a.
5. THE UNDERCUT QUANTITY ASSOCIATED WITH P-152a AND P-152c WILL NOT BE PAID FOR WITHOUT PRIOR APPROVAL OF THE UNSUITABLE SUBGRADE LIMITS BY THE RPR PRIOR TO MATERIAL REMOVAL.
6. P-222 SOIL STERILIZATION IS TO BE APPLIED IN LOCATIONS WERE NEW PAVEMENT IS INSTALLED OUTSIDE OF EXISTING PAVEMENT AREAS.

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69247 JON BRYCE WEEKS Date Signed 3/29/23 ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

INDEX OF DRAWINGS AND SUMMARY OF APPROXIMATE QUANTITIES

DRAWING: G002

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET: 2 OF 52

CATALOG NUMBER: A-270521

DATE SAVED: 3/31/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G002-INDX.DWG

GENERAL NOTES

1. IF DURING THE CONSTRUCTION PROCESS, CONDITIONS ARE ENCOUNTERED WHICH COULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, OR REPRESENT A SIGNIFICANT DIFFERENCE BETWEEN THE PROJECT SPECIFICATIONS/CONSTRUCTION PLANS AND FIELD CONDITIONS, THE CONTRACTOR SHALL CONTACT THE RESIDENT PROJECT REPRESENTATIVE (RPR) IMMEDIATELY.

2. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD, UNLESS SPECIFICALLY STATED OTHERWISE.

3. WHENEVER, IN THE PROJECT SPECIFICATIONS/CONSTRUCTION PLANS, THE WORDS "PROVIDE", "FURNISH", "INSTALL", "FURNISH AND INSTALL", OR SIMILAR WORDS ARE USED, IT SHALL BE UNDERSTOOD THAT THE INTENT OF THE PROJECT SPECIFICATIONS/CONSTRUCTION PLANS IS TO PROVIDE FOR THE CONSTRUCTION AND COMPLETION IN EVERY DETAIL THE WORK DESCRIBED. IT IS FURTHER INTENDED THAT THE CONTRACTOR SHALL FURNISH ALL LABOR, SUPERVISION, MATERIALS, EQUIPMENT, TOOLS, TRANSPORTATION, SUPPLIES, TESTING, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK IN ACCORDANCE WITH THE DRAWINGS (PLANS), PROJECT SPECIFICATIONS, AND TERMS OF THE CONTRACT.

4. CONTRACTOR SHALL KEEP A SET OF AS-BUILT DRAWINGS ON-SITE AND MAKE AVAILABLE TO THE RPR AT ALL TIMES. AS-BUILT SET SHALL BE SUBMITTED TO THE RPR AT THE COMPLETION OF THE JOB. CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING ALL AS-BUILT INFORMATION DURING THE PROJECT. THE CONTRACTOR SHALL NOTE, AND BRING TO THE RPR'S ATTENTION, ANY DISCREPANCIES BETWEEN THE PROJECT SPECIFICATIONS/CONSTRUCTION PLANS AND ACTUAL FIELD CONDITIONS.

5. ALL DAMAGE TO UTILITIES, PAVEMENT, EQUIPMENT, OR STRUCTURES FROM CONSTRUCTION ACTIVITIES SHALL BE IMMEDIATELY REPORTED TO THE RPR. THE RPR SHALL DETERMINE WHETHER REPAIR OR REPLACEMENT IS NECESSARY. ALL REPAIR METHODS SHALL BE SUBMITTED TO THE RPR FOR REVIEW AND APPROVAL PRIOR TO INITIATING THE WORK. REPAIRS SHALL BE MADE AT NO ADDITIONAL COST TO THE SPONSOR AND TO THE APPROVAL OF THE RPR.

6. THE CONTRACTOR SHALL PROVIDE WORKMANSHIP AND MATERIALS THAT ARE OF GOOD QUALITY AND COMPLY WITH THE REQUIREMENTS OF THE FAA SPECIFICATIONS FOR AIRPORT CONSTRUCTION AND/OR CURRENT UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION AS PUBLISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS AND AS AMENDED BY THE CITY OF MESA. ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THESE AMENDED SPECIFICATIONS AND DETAILS OR AS DIRECTED BY THE RPR ARE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

7. SWEEPER(S) SHALL BE AVAILABLE AT ALL TIMES TO CLEAN FOREIGN OBJECT DEBRIS (FOD) FROM HAUL ROUTE OR OTHER AREAS ADJACENT TO CONSTRUCTION ACTIVITY. CONTRACTOR SHALL CONSTANTLY MONITOR AIRCRAFT MOVEMENT AREAS FOR FOD AND IMMEDIATELY REMOVE ALL DEBRIS.

8. THE CONTRACTOR SHALL COORDINATE WORK SCHEDULES TO PREVENT ANY CONFLICTING WORK CONDITIONS WITH THE CITY OF MESA UTILITY, TRANSPORTATION AND AIRPORT CREWS.

9. INSPECTIONS WILL BE PROVIDED BY THE CITY OF MESA. THE CONTRACTOR SHALL NOTIFY THE RPR AT LEAST 48 HOURS IN ADVANCE OF ANY CONSTRUCTION.

10. THE CONTRACTOR SHALL HAVE A MINIMUM OF ONE (1) CURRENT COPY OF THE APPROVED PLANS (INCLUDING ANY CHANGE ORDERS, SUPPLEMENTAL AGREEMENTS, FIELD DIRECTIVES, ETC.), ONE (1) CURRENT COPY OF THE APPROPRIATE STANDARDS AND SPECIFICATIONS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB, ON SITE AT ALL TIMES.

11. WHERE THERE IS CONFLICT BETWEEN THESE PLANS AND THE SPECIFICATIONS, OR ANY APPLICABLE STANDARDS, THE HIGHER QUALITY STANDARD SHALL APPLY. ALL WORK SHALL BE INSPECTED AND APPROVED BY THE RPR.

12. DIMENSIONING FOR LAYOUTS AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWINGS. IF PERTINENT DIMENSIONS ARE NOT SHOWN, CONTACT THE RPR FOR CLARIFICATION AND RECORD DIMENSIONS ON AS-BUILT DRAWINGS

PERMITTING

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO PAY FOR THE COST TO OBTAIN ALL PERMITS REQUIRED.

2. THE CONTRACTOR SHALL SUBMIT A COPY OF ALL PERMITS REQUIRED FOR THE PROJECT TO THE RPR, FOR HIS REVIEW.

3. THIS PROJECT IS SUBJECT TO THE TERMS AND CONDITIONS OF THE CITY OF MESA'S ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM (AZPDES) GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PREPARE AND SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND ASSURE IT'S COMPLIANCE WITH THE AZPDES PERMIT AT ALL TIMES. THE CONTRACTOR SHALL BE REQUIRED TO FILE FOR A NOTICE OF INTENT TO DISCHARGE (NOI) PRIOR TO THE NOTICE TO PROCEED (NTP), AND FOR A NOTICE OF TERMINATION (NOT) AFTER CONSTRUCTION IS COMPLETED.

4. THE CONTRACTOR IS ADVISED THAT A DUST CONTROL PERMIT AND A DUST CONTROL PLAN MAY BE REQUIRED BY THE MARICOPA COUNTY AIR QUALITY DEPARTMENT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THIS PERMIT, IF NECESSARY, AND COMPLY WITH IT'S REQUIREMENTS. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A COPY OF THE DUST CONTROL PERMIT AND DUST CONTROL PLAN TO THE CITY FOR REVIEW.

SITE ACCESS AND STAGING

1. DURING CONSTRUCTION, THE CONTRACTOR SHALL MINIMIZE DISTURBANCES TO ALL CONSTRUCTION AREAS AND ACCESS ROUTES. THIS INCLUDES EQUIPMENT AND VEHICULAR RUTS CREATED IN ANY PAVEMENTS, ANY HAUL/ACCESS ROADS, OR ANY INFIELD/SAFETY AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES OR ROADS. REPAIRS SHALL BE MADE AT NO ADDITIONAL COST TO THE SPONSOR AND TO THE SATISFACTION OF THE RPR. HAUL ROUTE BRIDGES SHALL BE CONSTRUCTED AT HAUL ROUTES CROSSING EXISTING AIRFIELD PAVEMENT. COSTS ASSOCIATED WITH HAUL BRIDGE CONSTRUCTION WILL BE CONSIDERED INCIDENTAL TO MOBILIZATION.

2. BEFORE ESTABLISHING SITE ACCESS AND HAUL ROUTES, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE RPR. WHEN POSSIBLE, ACCESS/HAUL ROUTES SHALL UTILIZE EXISTING ROADS. THE CONTRACTOR SHALL MAINTAIN AIRPORT SECURITY AT ALL TIMES.

3. CONTRACTOR SHALL BE REQUIRED TO PROVIDED NON-POTABLE WATER FOR CONSTRUCTION PURPOSES. CONTRACTOR SHALL BE RESPONSIBLE FOR STORAGE OF NON-PORTABLE WATER. ANY STRUCTURES ERECTED IN SUPPORT OF WATERING OPERATIONS SHALL MEET FAA FAR PART 77 CLEARANCES FOR ALL AIRCRAFT AND BE APPROPRIATELY LIT AS A HAZARD TO THE FLYING PUBLIC. NON-PORTABLE WATER USED SHALL BE INCIDENTAL TO THE PROJECT BID ITEMS.

4. DURING ANY NIGHTTIME OPERATIONS ALL AREA LIGHTING SHALL FACED IN DIRECTIONS AS DIRECTED BY THE RPR. AT NO TIME SHALL LIGHT PLANTS BE LEFT RUNNING WHEN CONSTRUCTION OPERATIONS ARE NOT IN PROCESS.

5. ALL AREAS THAT ARE DISTURBED BY CONTRACTOR OPERATIONS, SHALL BE SEEDED PER T-901 SEEDING AND EROSION CONTROL.

6. ALL CONTRACTOR EMPLOYEES SHALL BE REQUIRED TO PARK IN THE CONTRACTORS DESIGNATED STAGING AREA ONLY AND SHALL BE DRIVEN TO THE PROJECT SITE BY DESIGNATED CONSTRUCTION VEHICLES.

7. CRAWLER TRACKED VEHICLES SHALL NOT BE ALLOWED ON PAVED SURFACES. TRACKED VEHICLES MUST BE MOVED ACROSS PAVED SURFACES ON A WHEELED VEHICLE.

8. WHENEVER CONSTRUCTION TRAFFIC IS REQUIRED TO CROSS AN ACTIVE RUNWAY, TAXIWAY, TAXILANE, OR INTERRUPT NORMAL TRAFFIC FLOW ON APRONS OR RAMPS, THE CONTRACTOR SHALL PROVIDE FLAGGERS AT THE CROSSING(S) AS REQUIRED BY THE CONSTRUCTION PHASING DRAWINGS OR AS DIRECTED BY THE RPR OR THE AIRPORT (INCIDENTAL TO ITEM C-105).

UTILITIES

1. PRIOR TO COMMENCING WORK, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE APPROPRIATE UTILITY AGENCIES, UTILITY NOTIFICATION CENTERS, AND TO FIELD VERIFY THE LOCATIONS AND DEPTHS, THROUGH UTILITY LOCATES AND POTHOLES, OF ALL EXISTING UTILITIES WITHIN THE PROJECT LIMITS, STAGING, AND HAUL ROUTE AREAS.

2. THE EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND SHALL NOT BE SCALED FOR EXACT LOCATION. LOCATION OF EXISTING DUCT BANK, CIRCUITING, UTILITIES AND STRUCTURES SHOWN ON THESE DRAWINGS IS BASED ON AVAILABLE INFORMATION AND IS NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL OF THESE ITEMS ARE SHOWN.

3. CONTRACTOR SHALL CONTACT AND COORDINATE WITH THE APPROPRIATE UTILITY AGENCIES WHEN WORKING ON OR WITHIN THE PROXIMITY OF AN AGENCIES UTILITY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.

4. ANY INTERRUPTION OF AN EXISTING SYSTEM OR UTILITY SERVICE SHALL BE COORDINATED AND APPROVED BY THE AIRPORT AND THE AUTHORITY, AGENCY, OR UTILITY HAVING JURISDICTION, PRIOR TO STARTING WORK INCLUDING CONTACTING THE AIRPORT AND FAA.

5. CONTRACTOR IS RESPONSIBLE FOR DAMAGES TO EXISTING UTILITIES. REPAIRS DEEMED NECESSARY BY THE RPR WILL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE SPONSOR. SEE SECTION 50 OF THE PROJECT SPECIFICATIONS AND THE "CONSTRUCTION STAKING AND LAYOUT" NOTES CONTAINED IN THESE GENERAL NOTES SHEETS FOR ADDITIONAL NOTES REGARDING UTILITY LOCATES.

SUBMITTALS

1. THE CONTRACTOR SHALL SUBMIT A DETAILED LISTING OF ALL SUBMITTALS (E.G., MIX DESIGNS, MATERIAL CERTIFICATION, AND PRODUCT INFORMATION) AND SHOP DRAWINGS REQUIRED BY THE TECHNICAL SPECIFICATIONS.

2. THE CONTRACTOR SHALL REVIEW THE PROJECT SPECIFICATIONS SECTION 100-05 FOR SUBMITTAL SCHEDULE REQUIREMENTS.

TRAFFIC CONTROL

1. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PROVIDING ALL REQUIRED TRAFFIC CONTROL FOR THE PROJECT'S ACCESS LOCATIONS, INCLUDING ANY REQUIREMENTS OF ADOT, CITY OF MESA, OR MARICOPA COUNTY. ALL ASSOCIATED COSTS ARE INCIDENTAL TO CONSTRUCTION AND WILL NOT BE PAID SEPARATELY.

MATERIAL SUPPLY AND DISPOSAL

1. ALL WASTE MATERIALS SHALL BE REMOVED FROM THE AIRPORT PROPERTY AT NO COST TO THE SPONSOR UNLESS OTHERWISE DIRECTED BY THE SPONSOR.

EROSION CONTROL

1. THE STORMWATER BMPS SHOWN IN THE ISSUED FOR CONSTRUCTION EROSION CONTROL SHEETS ARE TO BE USED AS A GUIDE FOR THE CONTRACTOR WHEN DEVELOPING HIS/HER STORMWATER POLLUTION PREVENTION PLAN. FIELD CONDITIONS MAY WARRANT MORE, LESS OR DIFFERENT BMP INSTALLATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEVELOP A STORMWATER AND EROSION CONTROL PLAN THAT MEETS ALL LOCAL, STATE, AND FEDERAL REQUIREMENTS ASSOCIATED WITH THE STORMWATER PERMIT.

2. SILT AND SEDIMENT SHALL BE REMOVED AFTER EACH SUBSTANTIAL RAINFALL.

3. NEGATIVE IMPACTS TO DOWNSTREAM AREAS CAUSED BY CONSTRUCTION ARE TO BE MONITORED AND CORRECTED BY THE CONTRACTOR. ANY OFF-SITE CLEAN-UP, DIRECTED BY RPR (INCLUDING STREET CLEANING), SHALL BE COMPLETED WITHIN 24-HOURS OF WRITTEN INSTRUCTION, OR RISK CONSTRUCTION STOPPAGE.

4. TEMPORARY EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL SUCH TIME AS ALL TRIBUTARY-DISTURBED AREAS ARE SUFFICIENTLY STABILIZED IN THE OPINION OF THE RPR, TO MINIMIZE EROSION POTENTIAL.

5. WHEN TEMPORARY EROSION CONTROL MEASURES ARE REMOVED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN-UP AND REMOVAL OF ALL SEDIMENT AND DEBRIS FROM ALL DRAINAGE AND OTHER PUBLIC FACILITIES.

6. ALL AREAS FOR SEEDING SHALL BE TILLED TO BREAK UP ROOTING RESTRICTIVE LAYERS, HAVE A MINIMUM OF 4" OF TOPSOIL REAPPLIED, AND THEN BE HARROWED, AND ROLLED OR PACKED, TO PREPARE THE REQUIRED FIRM SEED BED.

QUANTITIES

1. ALL STATED QUANTITIES ARE CONSIDERED APPROXIMATE. ACTUAL QUANTITIES WILL BE DETERMINED BY THE RPR FROM WORK IN-PLACE.

2. ACTUAL RATES OF APPLICATION WILL BE DETERMINED BY THE RPR.

3. ALL PAVEMENT REMOVAL SHALL BE MEASURED AND PAID TO NEAT LINE DIMENSIONS.

4. IF THE CONTRACTOR CHOOSES TO OVERBUILD PAVEMENT LAYERS BEYOND THE DIMENSIONS SHOWN ON THE PLANS FOR CONSTRUCTABILITY, NO PAYMENT WILL BE MADE FOR THIS ADDITIONAL MATERIAL.

5. THE FOLLOWING RATES WERE USED TO CALCULATE ESTIMATED QUANTITIES:

   5.1. ASPHALT REMOVAL IS BASED ON SQUARE YARD REGARDLESS OF ASPHALT DEPTH.

   5.2. BITUMINOUS TACK COAT AT THE RATE OF 0.10 GAL. PER SQUARE YARD PER LIFT.

CONSTRUCTION STAKING AND LAYOUT

1. THE CONTRACTOR SHALL PROVIDE VERIFICATION SURVEY TO RPR FOR ALL LOCATIONS WHERE PROPOSED CONSTRUCTION WILL TIE INTO ANY EXISTING STRUCTURES AND PAVEMENTS. THIS SURVEY SHALL BE USED FOR VERIFICATION OF EXISTING CONDITIONS AND SHALL BE SUBMITTED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES IN THE AREAS OF THE EXISTING INFRASTRUCTURE. WORK IN THESE AREAS SHALL NOT BE ALLOWED TO COMMENCE UNTIL THIS SURVEY VERIFICATION HAS BEEN SUPPLIED BY THE CONTRACTOR TO THE RPR AND HAS PROVIDED ACCEPTANCE, BASED ON A TIMELY REVIEW OF THE VERIFICATION SURVEY.

2. REQUIRED VERIFICATION/AS-BUILT SURVEY SHALL BE PROVIDED ELECTRONICALLY IN AN APPROVED FORMAT AND SHALL INCLUDE POINT NUMBER, NORTHING, EASTING, ELEVATION, AND DESCRIPTION (PNEZD, COMMA DELIMITED FORMAT).

3. DAILY FIELD SURVEY NOTES SHALL BE GIVEN TO THE RPR SO THAT PERIODIC CHECKS FOR CONFORMANCE WITH PLAN GRADES, ALIGNMENTS, AND GRADE TOLERANCES CAN BE REVIEWED.

4. SUBGRADE BLUE TOPS AT 50-FOOT STATIONS WITH A 50-FOOT OFFSET DISTANCE (MAXIMUM) AND AT THE EDGE OF PAVEMENT.

5. SUBBASE AND BASE COURSE BLUE TOPS AT 50-FOOT STATIONS WITH A 50-FOOT OFFSET DISTANCE (MAXIMUM) AND AT THE EDGE OF PAVEMENT.

6. PAVEMENT AREAS:

   6.1. EDGE OF PAVEMENT HUBS AND TACKS (FOR STRINGLINE BY CONTRACTOR) AT 100-FOOT STATIONS

   6.2. BETWEEN LIFTS AT 25-FOOT STATIONS FOR RUNWAYS (EACH PAVING LANE WIDTH), TAXIWAYS (EACH PAVING LANE WIDTH), AND HOLDING AREAS (EACH PAVING LANE WIDTH)

   6.3. AFTER FINISH PAVING OPERATIONS AT 50-FOOT STATIONS (FOR GRADE ACCEPTANCE VERIFICATION) AT ALL PAVED AREAS AT THE EDGE OF EACH PAVING LANE AND ALL GRADE BREAKS PRIOR TO NEXT PAVING LOT

   6.4. SHOULDER AND SAFETY AREA BLUE TOPS AT 50-FOOT STATIONS AND AT ALL BREAK POINTS WITH MAXIMUM OF 50-FOOT OFFSETS

7. ADDITIONAL STAKES OR MARKINGS SHALL BE REQUIRED AT AN INTERVAL TO CLEARLY DEFINE GRADES FOR SUB-GRADE AND ALL MATERIAL LIFTS REQUIRED FOR THE PAVEMENT STRUCTURE INCLUDING ALL SUBBASES, BASES, AND PAVEMENTS. ADDITIONAL STAKING AND CONTROLS SHALL BE PLACED AS NEEDED FOR CONSTRUCTION TO MEET THE DESIGN AS REQUIRED BY THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS. IN ADDITION TO LOCATIONS STATED ABOVE, STAKING FOR LAYOUT AND SURVEY FOR GRADE VERIFICATIONS SHALL BE PROVIDED AT LOCATIONS OF ALL SPOT ELEVATIONS WHEN PROVIDED FOR IN THE PLANS.

8. THE ESTABLISHMENT OF SURVEY CONTROL AND/OR REESTABLISHMENT OF SURVEY CONTROL SHALL BE BY A STATE LICENSED LAND SURVEYOR.

9. CONTROLS AND STAKES DISTURBED OR SUSPECT OF HAVING BEEN DISTURBED SHALL BE CHECKED AND/OR RESET AS DIRECTED BY THE RPR WITHOUT ADDITIONAL COST TO THE OWNER.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 59247 JON BRYCE WEEKS Date Signed 3/06/23 ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GENERAL NOTES

DRAWING G003

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 3 OF 52

CATALOG NUMBER: A-270522

DATE SAVED: 2/25/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G003-GENR.DWG

MASTER LEGEND

SITE

- EXISTING PAVEMENT
- EXISTING CENTERLINE
- 1385 EXISTING INDEX CONTOUR
- 1386 EXISTING INTERMEDIATE CONTOUR
- 1385 PROPOSED INDEX CONTOUR
- 1386 PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS
- EXISTING SWALE FLOW LINE
- X EXISTING FENCE
- XXXXXXXXXXXX INDICATED PAINT OBLITERATION ITEM
- ASPHALT PAVEMENT REMOVAL
- ASPHALT PAVEMENT SHOULDER REMOVAL
- ASPHALT PAVEMENT REMOVAL
- FULL DEPTH ASPHALT PAVEMENT
- FULL DEPTH ASPHALT PAVEMENT
- PARTIAL DEPTH ASPHALT PAVEMENT
- EXISTING PAINT
- PROPOSED WHITE PAINT
- PROPOSED YELLOW PAINT
- PROPOSED GREEN PAINT
- PROPOSED BLACK PAINT

GENERAL INFORMATION

- PACS - PRIMARY AIRPORT CONTROL STATION
- SACS - SECONDARY AIRPORT CONTROL STATION
- PROJECT TEMPORARY SURVEY CONTROL POINT
- RUNWAY END MONUMENT
- B-01 BORE/CORE HOLES
- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRCRAFT ROUTE
- RSA RUNWAY SAFETY AREA
- ROFA RUNWAY OBJECT FREE AREA
- TSA TAXIWAY SAFETY AREA
- TOFA TAXIWAY OBJECT FREE AREA
- X AOA FENCE
- FLASHER BARRICADE
- RUNWAY CLOSURE X
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- 1384.40 / 1384.38 DESIGN ELEVATION / EXISTING ELEVATION
- 230.50 / 230.47 PROFILE BAND
- EXISTING ELEVATION
- PROPOSED ELEVATION

STORM SEWER

- PROPOSED STORM PIPE
- PROPOSED INLET / OUTLET STRUCTURE
- PROPOSED RIPRAP (D50 = 9", T = 18")
- STORM PIPE
- C EXISTING STORM INLET
- EXISTING STORM FLARED END SECTION (F.E.S.)

EROSION CONTROL

- SA HM SEEDING WITH HYDROMULCH
- SCE STABILIZED CONSTRUCTION ENTRANCE
- IP INLET PROTECTION

ELECTRICAL

- EXISTING TAXIWAY EDGE LIGHT
- EXISTING RUNWAY EDGE LIGHT
- EL ELECTRICAL LINE TO BE REMOVED
- RUNWAY EDGE LIGHT TO BE REMOVED
- TAXIWAY EDGE LIGHT TO BE REMOVED
- JUNCTION BOX TO BE REMOVED

ABBREVIATIONS

AB	ABANDONED
AC	ACRE
ADG	AIRPORT DESIGN GROUP
ADOT	ARIZONA DEPARTMENT OF TRANSPORTATION
ARFF	AIRPORT RESCUE AND FIRE FIGHTING
AOA	AIRPORT OPERATIONS AREA
APS	ARIZONA PUBLIC SERVICE CO.
BMPS	BEST MANAGEMENT PRACTICES
BP	BEGINNING POINT OF ALIGNMENT
C	CURVE
CL	CENTERLINE
CY	CUBIC YARD
Δ	DELTA ANGLE
DIP	DUCTILE IRON PIPE
DIW	DIRTY INDUSTRIAL WASTE
E	EASTING COORDINATE
EA	EACH
EDB	ELECTRICAL DUCT BANK
EF	EACH FACE EL ELEVATION
EL	ELECTRICAL LINES
EOP	EDGE OF PAVEMENT
EP	ENDING POINT OF ALIGNMENT
EW	EACH WAY
FAA	FEDERAL AVIATION ADMINISTRATION
FES	FLARED END SECTION
FFZ	FALCON FIELD AIRPORT
FID	FLIGHT INFORMATION DUCT (FAA)
FOD	FOREIGN OBJECT DEBRIS
FOMO	FIXED OR MOVEABLE OBJECT
GAL	GALLON
HDPE	HIGH DENSITY POLYETHYLENE PIPE
ID	INSIDE DIAMETER
ILS	INSTRUMENT LANDING SYSTEM
INV	INVERT
INT	INTERSECTION
JFD	JET FUEL DISTRIBUTION
L	LENGTH
LF	LINEAL FEET
LLWAS	LOW LEVEL WIND SHEAR ALERT SYSTEM
LS	LUMP SUM
MGAL	THOUSAND GALLON
MH	MANHOLE
MO	MONTH
N	NORTHING COORDINATE
NGS	NATURAL GAS
NO.	NUMBER
NOAA	NATIONAL OCEANOGRAPHIC & ATMOSPHERIC ADMINISTRATION
NIC	NOT IN THIS CONTRACT
NTP	NOTICE TO PROCEED
NTS	NOT TO SCALE
OC	ON CENTER
OH	OVERHEAD LINES
OS	OFFSET FROM ALIGNMENT
OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
PB	ELECTRICAL PULL BOX
PC	POINT OF CURVATURE
PCR	POINT OF REVERSE CURVATURE
PGL	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
PPVC	PERFORATED UNDERDRAIN PIPE
PT	POINT OF TANGENT
PVC	POINT OF VERTICAL CURVATURE
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
ROFA	RUNWAY OBJECT FREE AREA
RPR	RESIDENT PROJECT REPRESENTATIVE
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
RW	RUNWAY
SAF	SANITARY SEWER (FORCE MAIN)
SAG	SANITARY SEWER (GRAVITY)
SDG	STORM WATER DRAINAGE (GRAVITY)
SF	SQUARE FEET
SHT	SHEET
SOI	SAND/OIL INTERCEPTOR
SPA	SPACES
STA	STATION
STL	STEEL
SY	SQUARE YARD
T1F	TYPE 1 DE-ICING FLUID
TW	TAXIWAY
TOFA	TAXIWAY OBJECT FREE AREA
TSA	TAXIWAY SAFETY AREA
TYP	TYPICAL
UG	UNDERGROUND
UMH	UNDERDRAIN MANHOLE
VC	VERTICAL CURVE
VSR	VEHICLE SERVICE ROAD
WMD	WASTE WATER MANAGEMENT
WWF	WELDED WIRE FABRIC

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS Date Signed 3/06/23 ARIZONA U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

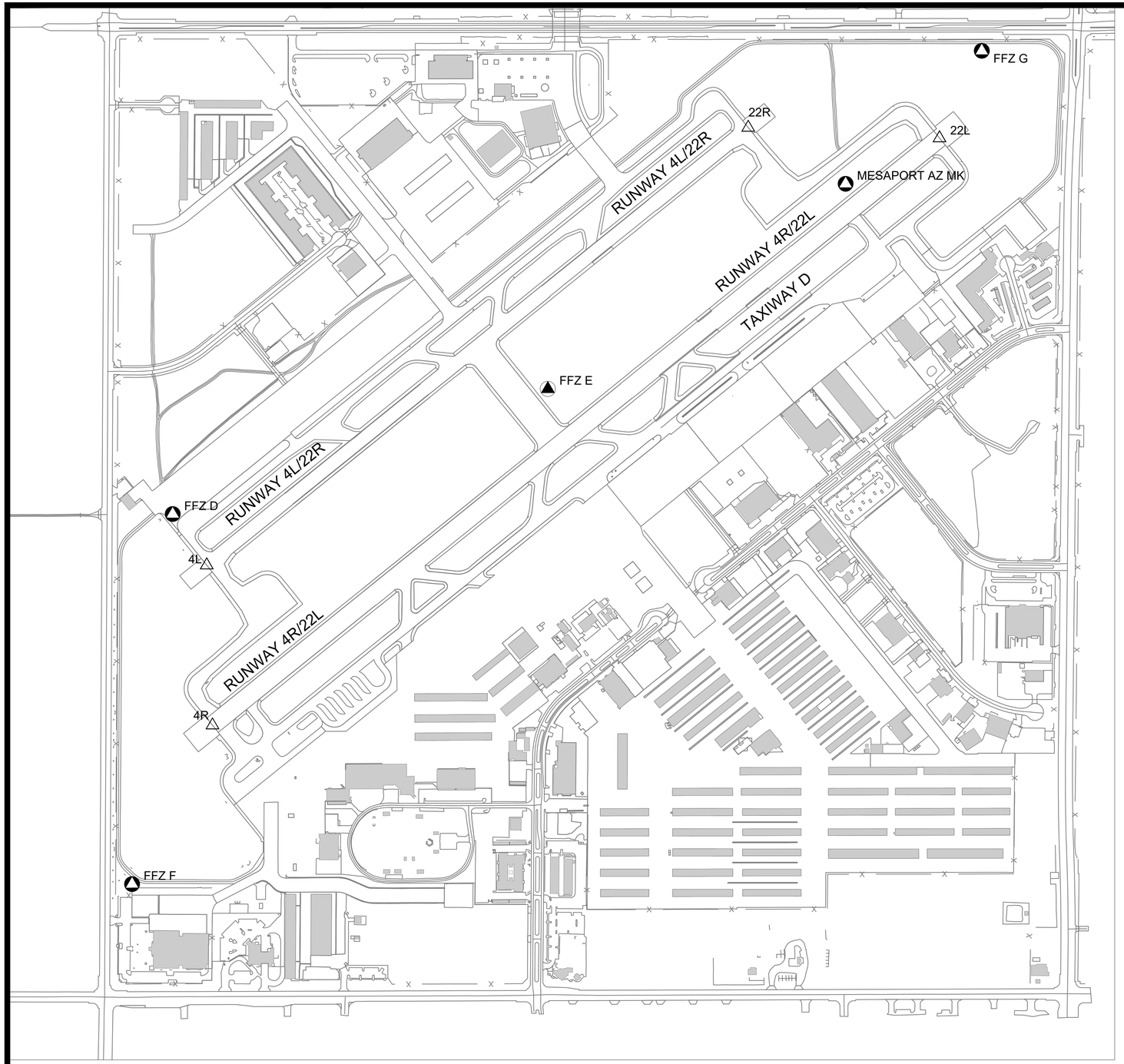
MASTER LEGEND AND ABBREVIATIONS

DRAWING: G004

SHEET: 4 OF 52

CATALOG NUMBER: A-270523

DATE SAVED: 2/24/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G004-LGND.DWG



PROJECT DATUM STATEMENT

COORDINATE SYSTEM: NAD83 (2011)
ARIZONA STATE PLANE CENTRAL ZONE 0202 (MODIFIED SEE BELOW)
UNITS: INTERNATIONAL SURVEY FEET (IFT)
GEOID MODEL: GEOID18

PROJECT COORDINATES ARE MODIFIED STATE PLANE GROUND COORDINATES.
PROJECT BROUGHT TO GROUND AT STATION FFZ E (PACS)

LAT: 33°27'39.36620" N
LONG: 111°43'41.07146" W

GROUND SCALE FACTOR: 1.0001575300

ELLIPSOID HEIGHT: 1281.18 FT
NAVD88 ELEVATION: 1378.17 FT (VERTICAL BM)

FFZ E, THE PRIMARY AIRPORT CONTROL STATION (PACS), IS TO BE HELD AS THE SITE VERTICAL BENCHMARK.

LAST SURVEY WAS COMPLETE BY JVIATION ON 10/22/2022

SURVEY NOTES:

1. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
2. CONTRACTOR SHALL VERIFY AIRPORT AND PROJECT CONTROL POINTS PRIOR TO CONSTRUCTION ACTIVITIES AND REPORT DISCREPANCIES TO THE ENGINEER.
3. CONTRACTOR SHALL PROTECT AND PRESERVE THE AIRPORT SURVEY CONTROL STATIONS.
4. IF THE PROJECT TEMPORARY SURVEY CONTROL IS DISTURBED DURING CONSTRUCTION ACTIVITIES, THE CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING NEW TEMPORARY CONTROL POINTS AS NECESSARY.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

GRAPHIC SCALE
150 0 150 300
(IN FEET)
1 " = 300' FULL SIZE
1" = 150' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

AIRPORT SURVEY CONTROL DATA

POINT NAME	PID	NORTHING	EASTING	ELEVATION	DESCRIPTION
FFZ E (PACS)	DL6293	895288.66	757514.78	1378.17 (BM)	STAINLESS STEEL ROD
MESAPORT AZ MK (SACS)	DU2236	896408.25	759139.46	1390.55 (V)	BRASS CAP
FFZ D (SACS	AC6815	894605.59	755467.48	1364.23 (P)	BRASS CAP
FFZ G (SACS)	DL6295	897134.04	759882.69	1390.50 (G)	STAINLESS STEEL ROD
FFZ F (SACS)	DL6294	892585.52	755245.75	1363.20 (G)	STAINLESS STEEL ROD

(BM) ELEVATION BENCHMARK, (G) GPS DERIVED ELEVATION, (P) PUBLISHED ELEVATION, (V) VERIFIED ELEVATION

RUNWAY END DATA

RW END	NORTHING	EASTING	ELEVATION	DESCRIPTION
04R	893454.76	755685.81	1365.5 (G)	BRASS TAB - WOOLPERT 2018
22L	896659.62	759653.71	1394.0 (G)	BRASS CAP
04L	894328.23	755654.49	1365.7 (G)	BRASS CAP
22R	896717.20	758609.74	1386.1 (G)	BRASS CAP

(BM) ELEVATION BENCHMARK, (G) GPS DERIVED ELEVATION, (P) PUBLISHED ELEVATION

SURVEY LEGEND

- PACS - PRIMARY AIRPORT CONTROL STATION
- SACS - SECONDARY AIRPORT CONTROL STATION
- RUNWAY END MONUMENT

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
60775
VICTOR
ARMENTA
DATE SIGNED 3-8-23
ARIZONA U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

SURVEY CONTROL PLAN

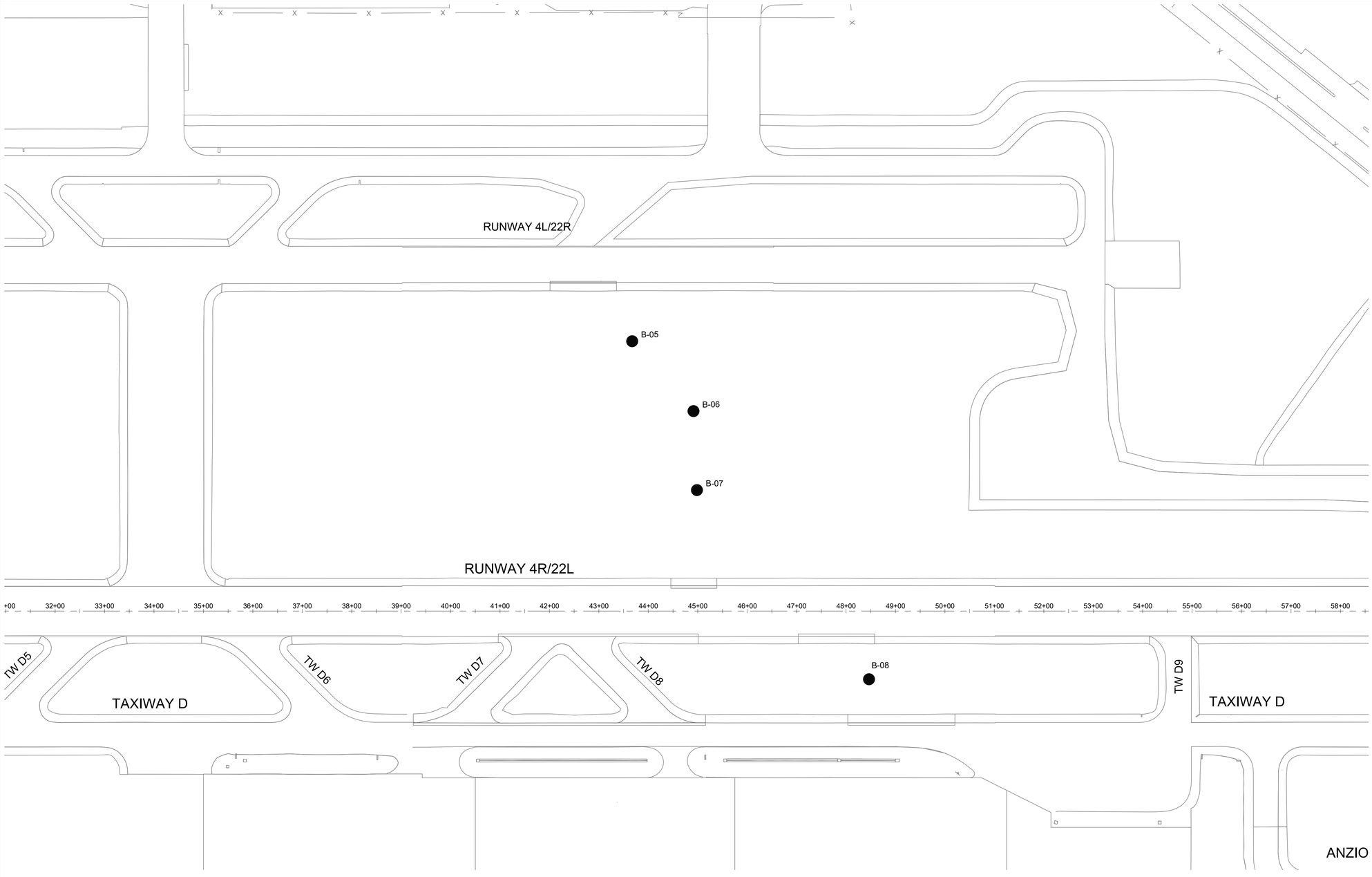
DRAWING G005

SHEET 5 OF 52

CATALOG NUMBER: A-270524

L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G005-SURV.DWG

DATE SAVED: 3/8/23



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

GEOTECHNICAL LEGEND

● B-1	BORE HOLE LOCATION

GEOTECHNICAL INVESTIGATION NOTES

1. FIELD INVESTIGATION COMPLETED ON 01/12/23 BY SPEEDIE AND ASSOCIATES.
2. REFER TO GENERAL NOTES FOR ADDITIONAL INFORMATION.
3. REFER TO CONSTRUCTION SAFETY PLAN FOR SAFETY REQUIREMENTS.
4. THE BORING INFORMATION PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY AND THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING EXISTING CONDITIONS AS NECESSARY PRIOR TO THE START OF CONSTRUCTION.

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 " = 100' FULL SIZE
1" = 50' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE NO.
59247
JON BRYCE
WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GEOTECHNICAL INVESTIGATION PLAN AND BORE LOG LOCATIONS

DRAWING G020

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: ____
PROJ. NO.: CP0994

SHEET 6 OF 52

CATALOG NUMBER: A-270525

DATE SAVED: 3/2/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G020-BORE.DWG

SOIL LEGEND

SAMPLE DESIGNATION		DESCRIPTION	
	AS	**Auger Sample**	A grab sample taken directly from auger flights.
	BS	**Large Bulk Sample**	A grab sample taken from auger spoils or from bucket of backhoe.
	S	**Spoon Sample**	Standard Penetration Test (ASTM D-1586) Driving a 2.0 inch outside diameter split spoon sampler into undisturbed soil for three successive 6-inch increments by means of a 140 lb. weight free falling through a distance of 30 inches. The cumulative number of blows for the final 12 inches of penetration is the Standard Penetration Resistance.
	RS	**Ring Sample**	Driving a 3.0 inch outside diameter spoon equipped with a series of 2.42-inch inside diameter, 1-inch long brass rings, into undisturbed soil for one 12-inch increment by the same means of the Spoon Sample. The blows required for the 12 inches of penetration are recorded.
	LS	**Liner Sample**	Standard Penetration Test driving a 2.0-inch outside diameter split spoon equipped with two 3-inch long, 3/8-inch inside diameter brass liners, separated by a 1-inch long spacer, into undisturbed soil by the same means of the Spoon Sample.
	ST	**Shelby Tube**	A 3.0-inch outside diameter thin-walled tube continuously pushed into the undisturbed soil by a rapid motion, without impact or twisting (ASTM D-1587).
	--	**Continuous Penetration Resistance**	Driving a 2.0-inch outside diameter "Bullnose Penetrometer" continuously into undisturbed soil by the same means of the spoon sample. The blows for each successive 12-inch increment are recorded.

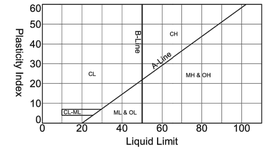
CONSISTENCY			RELATIVE DENSITY	
Clays & Silts	Blows/Foot	Strength (tons/sq ft)	Sands & Gravels	Blows/Foot
Very Soft	0 - 2	0 - 0.25	Very Loose	0 - 4
Soft	2 - 4	0.25 - 0.5	Loose	5 - 10
Firm	5 - 8	0.5 - 1.0	Medium Dense	11 - 30
Stiff	9 - 15	1 - 2	Dense	31 - 50
Very Stiff	16 - 30	2 - 4	Very Dense	> 50
Hard	> 30	> 4		

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVELLY SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE			GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE			SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL OR MODIFIED SYMBOLS MAY BE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS OR TO PROVIDE A BETTER GRAPHICAL PRESENTATION OF THE SOIL

MATERIAL SIZE	PARTICLE SIZE Lower Limit mm	Lower Limit Sieve Size ♦	Upper Limit mm	Upper Limit Sieve Size ♦
SANDS Fine	0.075	#200	0.42	#40
Medium	0.420	#40	2.00	#10
Coarse	2.000	#10	4.75	#4
GRAVELS Fine	4.75	#4	19	0.75" ×
Coarse	19	0.75" ×	75	3" ×
COBBLES	75	3" ×	300	12" ×
BOULDERS	300	12" ×	900	36" ×

♦U.S. Standard ×Clear Square Openings



Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Graphic Log	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
0		Hard Light Brown to Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel	RS-1	2.0	15.0	91.8	
3.0		Medium Dense Light Brown to Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation	S-2	6.5	NT	NT	
10		Very Dense					
11.5		End of Boring	S-3	11.5	NT	NT	75/12"

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-5**

Falcon Field Taxiways
4800 East Falcon Drive
Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 3/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Graphic Log	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
0		Very Stiff Brown to Light Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel	S-1	2.5	NT	NT	
		Whitish Brown, Weak Calcareous Cementation					
5.0			BS-2	5.0	NT	NT	
		Medium Dense Light Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel	S-3	6.5	NT	NT	
8.0							
10		Hard Light Brown SANDY LEAN CLAY (CL-Dry to Moist) with Moderate Calcareous Cementation	S-4	10.8	NT	NT	50/3"
11.5		End of Boring					

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-6**

Falcon Field Taxiways
4800 East Falcon Drive
Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 3/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Graphic Log	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
0		Very Stiff Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation	S-1	2.5	NT	NT	
		Whitish Brown					
5.0		Medium Dense Brown SILTY SAND (SM-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation	BS-2	5.0	NT	NT	
			S-3	6.5	NT	NT	
7.0		Hard Light Brown LEAN CLAY with SAND (CL-Dry to Moist) with Weak Calcareous Cementation					
10		Moderate Calcareous Cementation	S-4	10.5	NT	NT	50/6"
10.5		End of Boring					

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-7**

Falcon Field Taxiways
4800 East Falcon Drive
Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 3/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Graphic Log	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
0		Very Stiff Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation	S-1	2.5	NT	NT	
		Whitish Brown					
5.0		Hard Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel	BS-2	5.0	NT	NT	
			RS-3	6.0	8.7	84.8	
7.0		Hard SANDY LEAN CLAY (CL-Dry to Moist) with Weak Calcareous Cementation					
10							
11.5		End of Boring	S-4	11.5	NT	NT	74/12"

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-8**

Falcon Field Taxiways
4800 East Falcon Drive
Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 3/8/23

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 59247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GEOTECHNICAL INVESTIGATION BORE LOGS

DRAWING: G021

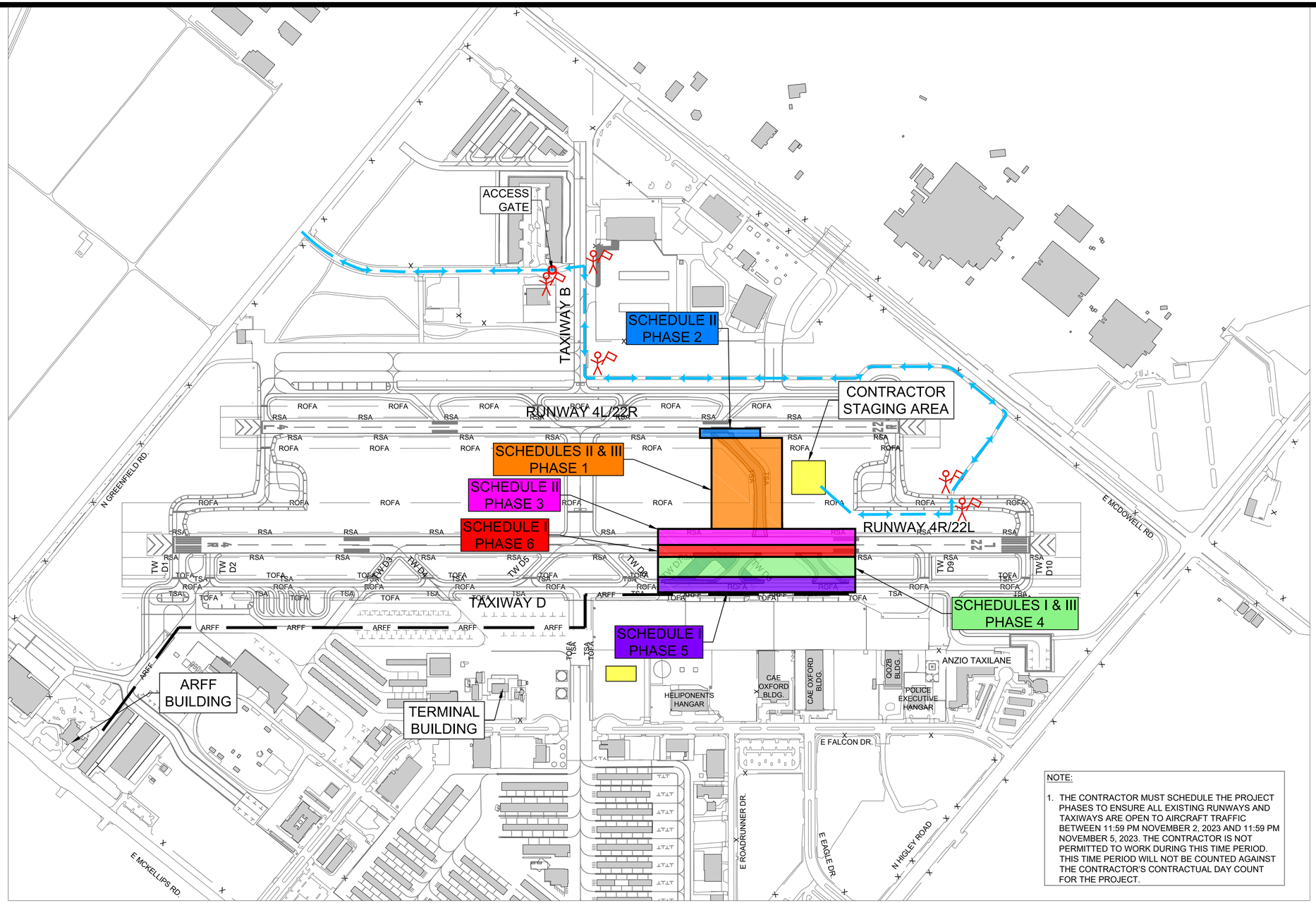
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: _____
PROJ. NO.: CP0994

SHEET: 7 OF 52

CATALOG NUMBER: A-270526

DATE SAVED: 3/2/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G020-BORE.DWG

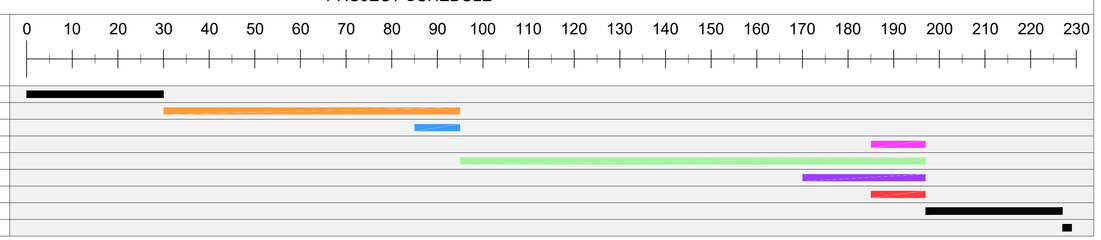


NOTE:

1. THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

PROJECT SCHEDULE

SCHEDULE / PHASE	DURATION
ADMINISTRATIVE PHASE	30 CALENDAR DAYS
SCHEDULES II & III, PHASE 1	65 CALENDAR DAYS
SCHEDULE II, PHASE 2	10 CALENDAR DAYS
SCHEDULE II, PHASE 3	12 CALENDAR DAYS
SCHEDULES I & III, PHASE 4	102 CALENDAR DAYS
SCHEDULE I, PHASE 5	27 CALENDAR DAYS
SCHEDULE I, PHASE 6	12 CALENDAR DAYS
PERMANENT PAINT DELAY	30 CALENDAR DAYS
PERMANENT PAINT	2 CALENDAR DAYS



SAFETY & OBJECT FREE AREAS

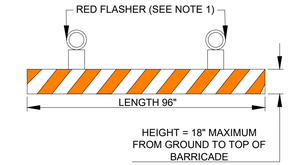
RUNWAY 4R/22L B-II	
RUNWAY SAFETY AREA (RSA)	75' FROM RW CENTERLINE
RUNWAY EXTENDED SAFETY AREA (RSA)	300' FROM RW END
RUNWAY OBJECT FREE AREA (ROFA)	250' FROM RW CENTERLINE
RUNWAY 4L/22R B-I	
RUNWAY OBJECT FREE AREA (RSA)	60' FROM RW CENTERLINE
RUNWAY EXTENDED SAFETY AREA (RSA)	240' FROM RW END
RUNWAY OBJECT FREE AREA (ROFA)	125' FROM CENTERLINE
TAXIWAYS G, D7 AND D8 (ADG II, TDG-2A)	
TAXIWAY SAFETY AREA (TSA)	79'
TAXIWAY OBJECT FREE AREA (TOFA)	124'

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLGGER / GATE GUARD
- CONTRACTOR GATE ACCESS





1. FLASHER BARRICADES WILL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR AT ALL TIMES. CONTRACTOR SHALL ALSO PROVIDE SPARE BARRICADES, BATTERIES, AND LIGHT BULBS FOR MAINTENANCE DURING NIGHTTIME HOURS.
2. LOW-PROFILE BARRICADES TO BE PLACED WITH 10' INTERVALS ADJACENT TO CONSTRUCTION, AS DIRECTED BY THE RPR/FALCON FIELD.
3. BARRICADES ARE TO BE PLACED IN LOCATIONS SHOWN ON THE PLANS AND AS DIRECTED BY THE RPR/FALCON FIELD THROUGHOUT ALL PHASES OF THE PROJECT. THE BARRICADE LOCATIONS PROVIDED ON THIS SHEET SHALL REMAIN THROUGHOUT CONSTRUCTION. ADDITIONAL BARRICADES WILL BE REQUIRED ACROSS PHASE SPECIFIC AREAS OF CLOSED PAVEMENT, AND ARE SHOWN ON PHASING SHEETS.
4. FLASHER BARRICADES WILL BE REQUIRED ALONG THE EDGE OF ANY VERTICAL DROP OFF GREATER THAN 3". AIRPORT OPERATIONS WILL ISSUE NOTAM TO ADVISE AIRCRAFT OF THIS CONDITION
5. FLASHER BARRICADES ARE TO BE ADEQUATELY WEIGHTED SO THEY WILL REMAIN IN PLACE DURING TIMES OF HIGH WINDS OR AS APPROVED BY THE RPR/FALCON FIELD.

1 FLASHER BARRICADE
NTS

GRAPHIC SCALE
300 0 300 600
(IN FEET)
1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING OVERALL SCHEDULES AND PHASE PLAN

DRAWING G050

SHEET 8 OF 52

CATALOG NUMBER: A-270527

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\0000-FFZ-MCTE-G050-CPLN.DWG

1. COORDINATION

ALL COORDINATION WILL TAKE PLACE THROUGH THE RPR/FALCON FIELD. NO CLOSURES WITHIN THE MOVEMENT AREAS WILL BE PERMITTED WITHOUT A NOTAM IN PLACE FOR EACH SPECIFIC CLOSURE. PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL GIVE 72 HOURS ADVANCE NOTICE TO THE RPR/FALCON FIELD FOR FILING OF ALL NOTAMS.

A WEEKLY CONSTRUCTION PROGRESS MEETING WILL BE REQUIRED TO DISCUSS ALL OPERATIONAL SAFETY TOPICS THAT HAVE BEEN AFFECTED OR WILL BE AFFECTED IN THE NEAR FUTURE.

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RPR IMMEDIATELY. ALL PARTIES WILL EVALUATE THE IMPACT OF THE CHANGE AND WILL DETERMINE THE MEASURES NEEDED TO MAINTAIN A SAFE CONSTRUCTION SITE.

THE FAA AIR TRAFFIC OPERATORS WILL BE NOTIFIED IMMEDIATELY IF ANY CHANGES AFFECT AIRCRAFT MOVEMENT. ALL COMMUNICATIONS WITH THE FAA TOWER WILL BY HANDLED BY AIRPORT OPERATIONS.

AIRPORT RUNWAYS AND TAXIWAYS SHOULD REMAIN IN USE BY AIRCRAFT TO THE MAXIMUM EXTENT POSSIBLE.

AIRCRAFT USE OF AREAS NEAR THE CONTRACTOR'S WORK SHOULD BE CONTROLLED TO MINIMIZE DISTURBANCE TO THE CONTRACTOR'S OPERATION.

CONSTRUCTION THAT IS WITHIN THE SAFETY AREA OF AN ACTIVE RUNWAY, TAXIWAY, OR APRON MUST BE PERFORMED WHEN THE RUNWAY, TAXIWAY, OR APRON IS CLOSED OR USE-RESTRICTED AND INITIATED ONLY WITH PRIOR PERMISSION FROM THE AIRPORT OPERATOR AND WITH PROPER NOTAMS IN PLACE.

THE CONTRACTING OFFICER, AIRPORT OPERATOR, OR OTHER DESIGNATED AIRPORT REPRESENTATIVE MAY ORDER THE CONTRACTOR TO SUSPEND OPERATIONS; MOVE PERSONNEL, EQUIPMENT, AND MATERIALS TO A SAFE LOCATION; BARRICADE ANY OPEN TRENCHES AND STAND BY UNTIL AIRCRAFT USE IS COMPLETED.

2. PHASING

THIS PROJECT CONSISTS OF 3 PHASES. SEE CONSTRUCTION SAFETY DRAWINGS FOR PHASING REQUIREMENTS.

3. AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY

ALL WORK WITHIN AIRPORT OPERATIONS AREA (AOA) SHALL CONFORM TO ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

CONTRACTOR SHALL ADHERE TO REQUIREMENTS AS MENTIONED ON THIS SHEET, THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), AND CONSTRUCTION SAFETY DRAWINGS. THESE REQUIREMENTS INCLUDE, BUT ARE NOT LIMITED TO, LIFE & SAFETY ACCESS ROUTES, AIRCRAFT ROUTES, PEDESTRIAN ROUTES, CONSTRUCTION ACCESS ROUTES, CONSTRUCTION LIMITS, AND BARRICADE LOCATIONS.

4. CONTRACTOR ACCESS

CONTRACTOR HAS ACCESS TO ONE (1) GATE TO ENTER THE AIRPORT. SEE CONSTRUCTION SAFETY DRAWINGS FOR GATE LOCATION. CONTRACTOR SHALL PROVIDE A GATE GUARD AT THIS GATE AT ALL TIMES WHEN GATE IS NOT CLOSED AND LOCKED.

CONTRACTOR MOVEMENT SHALL BE RESTRICTED TO THE PRE-DETERMINED ACCESS ROUTES AS SHOWN ON CONSTRUCTION SAFETY DRAWINGS.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST BE IDENTIFIED CLEARLY WITH 8-INCH (MINIMUM) BLOCK-TYPE CHARACTERS OF A CONTRASTING COLOR AND EASY TO READ.

ALL VEHICLES AND EQUIPMENT OPERATING IN THE AOA MUST HAVE FLAG (DAY ONLY) OR BEACON (DAY AND NIGHT) ATTACHED TO THE VEHICLE.

VEHICLE TRAFFIC LOCATED IN OR CROSSING AN ACTIVE MOVEMENT AREA MUST BE ESCORTED BY AIRPORT OPERATIONS WHO WILL BE IN RADIO CONTACT WITH THE TOWER. THE DRIVER, THROUGH PERSONAL OBSERVATION, SHOULD CONFIRM THAT NO AIRCRAFT IS APPROACHING THE VEHICLE POSITION. CONTRACTOR PERSONNEL MAY OPERATE IN THE MOVEMENT AREA WITHOUT TWO-WAY RADIO COMMUNICATION PROVIDED A NOTAM IS ISSUED CLOSING THE AREA AND THE AREA IS PROPERLY MARKED TO PREVENT INCURSIONS. CONTINUOUS MONITORING IS REQUIRED ONLY WHEN EQUIPMENT MOVEMENT IS NECESSARY IN CERTAIN AREAS. CONTRACTOR SHALL NOT COMMUNICATE DIRECTLY WITH THE TOWER OR CTAF. ALL TOWER COMMUNICATION SHALL BE PERFORMED BY AIRPORT OPERATIONS.

CONTRACTOR IS REQUIRED TO NOTIFY AND COORDINATE WITH THE RPR AND AIRPORT OPERATIONS PRIOR TO ENTERING ANY ACTIVE SURFACE SAFETY AREAS OR OBJECT FREE AREAS.

CONTRACTOR, SUBCONTRACTOR, AND SUPPLIER EMPLOYEES OR ANY UNAUTHORIZED PERSONS ARE RESTRICTED FROM ENTERING AN AIRPORT AREA THAT WOULD BE HAZARDOUS.

5. WILDLIFE MANAGEMENT

CONTRACTOR SHALL ADHERE TO ALL WILDLIFE MANAGEMENT PRACTICES AS STATED IN ADVISORY CIRCULAR 150/5200-33B, HAZARDOUS WILDLIFE ATTRACTIONS ON OR NEAR AIRPORTS, AND CERTALERT 98-08, GRASSES ATTRACTIVE TO HAZARDOUS WILDLIFE.

CONTRACTOR IS RESPONSIBLE FOR COMPLETING A DAILY INSPECTION FOR TRASH, FOREIGN OBJECTS, AND STANDING WATER ON THE CONSTRUCTION SITE THAT MIGHT ATTRACT WILDLIFE.

CONTRACTOR SHALL MAINTAIN ALL FENCES AND GATES THROUGHOUT THE PROJECT TO THE SATISFACTION OF THE RPR.

CONTRACTOR SHALL NOTIFY THE RPR WHEN A WILDLIFE SIGHTING HAS OCCURRED ON THE PROJECT SITE.

6. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

CONTRACTOR SHALL KEEP ALL PAVEMENTS IN THE AOA INCLUDING APRONS, TAXIWAYS, AND RUNWAYS FREE FROM FOD AT ALL TIMES TO PREVENT ANY DEBRIS FROM BEING INGESTED INTO AN AIRCRAFT'S ENGINE OR ANY DEBRIS FROM BEING LAUNCHED DUE TO JET BLAST.

CONTRACTOR IS REQUIRED TO CONTINUOUSLY MONITOR AND MAINTAIN FOD TO THE SATISFACTION OF THE RPR.

PRIOR TO OPENING ANY PAVEMENT TO AIRCRAFT, THE CONTRACTOR, RPR, AND AIRPORT OPERATIONS SHALL CONDUCT A SWEEP OF THE PAVEMENT TO VERIFY THAT THE PAVEMENT IS FREE FROM FOD.

THE CONTRACTOR IS ADVISED THAT DUST CONTROL, CLEANUP OF ACTIVE PAVEMENTS, TRACKING DEBRIS ONTO ACTIVE PAVEMENT AND GENERAL JOBSITE CLEANLINESS IS A SERIOUS SAFETY CONCERN. FOREIGN OBJECT DEBRIS (FOD) IS CONSIDERED AS ANY ITEM THAT COULD POSSIBLY IMPACT THE OPERATIONS OF AN AIRPORT OR ROADWAY. FOD COULD CAUSE INJURY OR DEATH THROUGH INGESTION IN MOVING AIRCRAFT ENGINES. SPECIFIC ITEMS OF CONCERN INCLUDE, BUT ARE NOT LIMITED TO; ANY PACKAGING FROM MATERIAL INSTALLATION, GRAVEL LEFT ON ACTIVE PAVEMENTS, DUST TRACKED ONTO ACTIVE PAVEMENTS, HAND TOOLS, HARDWARE DROPPED, ETC.

7. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT

CONTRACTOR SHALL NOTIFY RPR AND AIRPORT EMERGENCY PERSONNEL IF HAZARDOUS MATERIALS ARE ENCOUNTERED ON THIS PROJECT.

8. NOTIFICATION OF CONSTRUCTION ACTIVITIES

AGENCY NAME	AGENCY TYPE	TELEPHONE
AIRPORT EMERGENCY	24 HOUR AIRPORT OPERATIONS	(640) 540-6612 OR 911
MESA POLICE DEPARTMENT	SHERIFF / POLICE	(480) 644-2211 OR 911
MESA FIRE DEPARTMENT	FIRE RESCUE	(480) 644-2211 OR 911
MOUNTAIN VISTA MEDICAL CENTER	GENERAL HOSPITAL	(480) 358-6100 OR 911
AIRPORT ADMINISTRATION/ BADGING	AIRPORT ADMINISTRATION	(480) 644-2450
AIRPORT OPERATIONS	AIRPORT OPERATIONS	(480) 644-2450

BEFORE BEGINNING ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR MUST, THROUGH THE RPR AND AIRPORT OPERATIONS, GIVE NOTICE USING THE NOTICE TO AIRMEN (NOTAM) SYSTEM OF PROPOSED LOCATION, TIME, AND DATE OF COMMENCEMENT OF CONSTRUCTION. ALL NOTAMS SHALL BE ISSUED BY RPR/FALCON FIELD. UPON COMPLETION OF WORK AND RETURN OF ALL SUCH AREAS TO STANDARD CONDITIONS, THE CONTRACTOR MUST COORDINATE WITH THE RPR AND VERIFY THE CANCELLATION OF ALL NOTICES ISSUED VIA THE NOTAM SYSTEM. THROUGHOUT THE PROJECT DURATION , THE CONTRACTOR MUST:

A. BE AWARE OF AND UNDERSTAND THE SAFETY PROBLEMS AND HAZARDS DESCRIBED IN ADVISORY CIRCULAR 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.
B. CONDUCT ACTIVITIES SO AS NOT TO VIOLATE ANY SAFETY STANDARDS CONTAINED IN ADVISORY CIRCULAR 150/5370-2G OR ANY OF THE REFERENCES THEREIN.
C. INSPECT ALL CONSTRUCTION AND STORAGE AREAS AS OFTEN AS NECESSARY TO BE AWARE OF CONDITIONS.
D. PROMPTLY TAKE ALL ACTIONS NECESSARY TO PREVENT OR REMEDY ANY UNSAFE OR POTENTIALLY UNSAFE CONDITIONS AS SOON AS THEY ARE DISCOVERED.
E. THE CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS, PROVISIONS, AND PROCEDURES OUTLINED IN CONSTRUCTION SAFETY PHASING PLAN.

8. NOTIFICATION OF CONSTRUCTION ACTIVITIES (CONTINUED)

ANY CHANGES TO SCOPE OR SCHEDULE MUST BE NOTIFIED TO THE RPR AND AIRPORT OPERATIONS SO THAT NOTAMS CAN BE ISSUED, MAINTAINED, AND CANCELED.

IN AN EVENT OF AN EMERGENCY, CONTRACTOR SHALL NOTIFY THE RPR, AIRPORT OPERATIONS, AND AIRPORT EMERGENCY.

9. INSPECTION REQUIREMENTS

CONTRACTOR SHALL COMPLETE A DAILY INSPECTION FOR SAFETY ON THE PROJECT SITE BY COMPLETING THE CHECKLIST PROVIDED IN ADVISORY CIRCULAR 150/5370-2G, APPENDIX D, CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST.

THE CONTRACTOR, RPR AND AIRPORT OPERATIONS MUST PERFORM ONSITE INSPECTIONS THROUGHOUT THE PROJECT, WITH IMMEDIATE REMEDY OF ANY DEFICIENCIES, WHETHER CAUSED BY NEGLIGENCE, OVERSIGHT, OR SCOPE CHANGE.

CONTRACTOR SHALL COMPLETE A FINAL INSPECTION FOR SAFETY ON THE PROJECT SITE AT THE END OF EACH PHASE.

10. APPROACH CLEARANCE TO RUNWAYS

RUNWAY THRESHOLDS MUST PROVIDE AN UNOBSTRUCTED APPROACH SURFACE OVER EQUIPMENT AND MATERIALS. (REFER TO CHAPTER 3 IN ADVISORY CIRCULAR 150/5300-13A, AIRPORT DESIGN, FOR GUIDANCE.

11. RUNWAY AND TAXIWAY VISUAL AIDS

FLASHER BARRICADES, ARE TO BE PLACED AS DETAILED IN THE PLANS AND IN ALL DESIGNATED AREAS AS SHOWN ON THE CONSTRUCTION SAFETY DRAWINGS.

APPROVED FLASHER BARRICADES SHALL BE PROVIDED AND MAINTAINED BY THE CONTRACTOR.

CONTRACTOR TO COVER ALL TAXIWAY EDGE LIGHTS, TAXIWAY SIGNS, RUNWAY SIGNS, AND APRON EDGE LIGHTS FOR AREAS CLOSED BY NOTAM TO THE APPROVAL OF THE RPR.

12. MARKING AND SIGNS FOR ACCESS ROUTES

ALL REQUIRED SIGNS AND MARKINGS SHALL CONFORM TO ADVISORY CIRCULAR 150/5340-18G, STANDARD FOR AIRPORT SIGN SYSTEMS, OR THE FEDERAL HIGHWAY ADMINISTRATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL SIGNS ADJACENT TO AREAS USED BY AIRCRAFT MUST COMPLY WITH THE FRANGIBLE REQUIREMENTS AS STATED IN ADVISORY CIRCULAR 150/5220-23A, FRANGIBLE CONNECTIONS.

13. HAZARD MARKINGS AND LIGHTING

PRIOR TO CLOSING ANY AREAS IN THE AOA TO AIRCRAFT OR EMERGENCY TRAFFIC, CONTRACTOR MUST CLEARLY DEFINE CLOSED AREAS WITH WARNING LIGHTS, BARRICADES, CLOSED 'X' MARKINGS, RCMS, AND FLAGS TO THE APPROVAL OF THE RPR. CONTRACTOR TO REFER TO CONSTRUCTION SAFETY DRAWINGS.

HAZARDOUS AREAS ON THE MOVEMENT AREA WILL BE MARKED WITH FLASHER BARRICADES. THESE BARRICADES RESTRICT ACCESS AND MAKE HAZARDS OBVIOUS TO AIRCRAFT, PERSONNEL, AND VEHICLES. DURING PERIODS OF LOW VISIBILITY AND AT NIGHT, IDENTIFY HAZARDOUS AREAS WITH RED FLASHING LIGHTS.

OPEN TRENCHES AND EXCAVATIONS MUST BE PROMINENTLY MARKED WITH RED OR ORANGE FLAGS AND LIGHTS AS APPROVED BY THE RPR.

14. PROTECTION OF RUNWAY AND TAXIWAY AREAS

SAFETY AREAS - CONTRACTOR SHALL NOT IMPEDE ON THE SAFETY AREAS WITHOUT A CLOSURE OF THE RUNWAY/TAXIWAY BY MEANS OF A NOTAM.

OBJECT FREE AREAS - CONTRACTOR SHALL NOT PLACE EQUIPMENT, MATERIAL, OR STOCKPILES IN THIS AREA. ALL OBJECTS OR MATERIALS ADJACENT TO THIS AREA SHALL BE PROPERLY MARKED/LIT PER ADVISORY CIRCULAR 150/5370-2G. CONTRACTOR CANNOT WORK IN ACTIVE TAXIWAY OBJECT FREE AREA WITHOUT WING WALKERS TO MAINTAIN A 5' CLEARANCE FROM THE WINGSPAN OF THE AIRCRAFT TO CONSTRUCTION EQUIPMENT OR MATERIAL.

OBSTACLE FREE ZONE- CONTRACTOR TO PREVENT PERSONNEL, MATERIAL, AND/OR EQUIPMENT FROM PENETRATING THE OBSTACLE FREE ZONE AS DEFINED IN ADVISORY CIRCULAR 150/5300-13A.

15. AIRPORT SECURITY

CONTRACTOR SHALL ADHERE TO AIRPORT SECURITY REQUIREMENTS AT ALL TIMES. SECURITY IDENTIFICATION BADGES AND RELATED AIRPORT FAMILIARIZATION REQUIREMENTS ARE MANDATORY. KEY CONSTRUCTION SUPERINTENDENTS AND ANY OTHER PERSONNEL DEEMED NECESSARY BY THE AIRPORT SHALL BE REQUIRED TO BE BADGED BY THE AIRPORT, AT THE EXPENSE OF THE CONTRACTOR PRIOR TO CONSTRUCTION. UNBADGED CONSTRUCTION PERSONNEL SHALL BE ESCORTED AT ALL TIMES DURING AIRSIDE CONSTRUCTION.

16. OTHER LIMITATIONS ON CONSTRUCTION

PROHIBITING OPEN-FLAME WELDING OR TORCH CUTTING OPERATIONS UNLESS ADEQUATE FIRE SAFETY PRECAUTIONS ARE PROVIDED AND THESE OPERATIONS HAVE BEEN AUTHORIZED BY THE AIRPORT OPERATOR (AS TAILORED TO CONFORM TO LOCAL REQUIREMENTS AND RESTRICTIONS).

PROMINENTLY MARKING OPEN TRENCHES, EXCAVATIONS, AND STOCKPILED MATERIALS AT THE CONSTRUCTION AND LIGHTING THESE OBSTACLES DURING HOURS OF RESTRICTED VISIBILITY AND DARKNESS.

MARKING AND LIGHTING CLOSED, DECEPTIVE, AND HAZARDOUS AREAS ON AIRPORTS, AS APPROPRIATE. CONSTRAINING STOCKPILED MATERIAL TO PREVENT ITS MOVEMENT AS A RESULT OF THE MAXIMUM ANTICIPATED AIRCRAFT BLAST AND FORECAST WIND CONDITIONS.

NO USE OF TALL EQUIPMENTS (CRANES, CONCRETE PUMPS, AND SO ON) UNLESS A FAA 7460-1 DETERMINATION LETTER IS ISSUED FOR SUCH EQUIPMENT.

NO USE OF ELECTRICAL BLASTING CAPS ON OR WITHIN 1,000' OF THE AIRPORT PROPERTY.

NO USE OF FLARE POTS WITHIN THE AOA.

17. DUST CONTROL

CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST FROM THE CONSTRUCTION SITE AT ALL TIMES. CONTRACTOR SHALL HAVE A WATER TRUCK AND OPERATOR AVAILABLE 24 HOURS A DAY TO CONTROL DUST. THE PROJECT'S LOCATION IS NEAR ACTIVE RUNWAYS AND HIGHWAYS AND IS IN A LOCATION THAT EXPERIENCES HIGH WIND. IT IS CRITICAL FOR THE CONTRACTOR TO KEEP DUST TO AN ABSOLUTE MINIMUM BOTH DURING CONSTRUCTION, AND AFTER CONSTRUCTION UNTIL THE EXPOSED SURFACES CONTAIN SUSTAINABLE VEGETATION. CONTRACTOR SHALL PROVIDE THE RPR AND AIRPORT OPERATIONS WITH A CONTACT FOR 24 HOUR DUST CONTROL.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY PLAN SAFETY NOTES

DRAWING G051

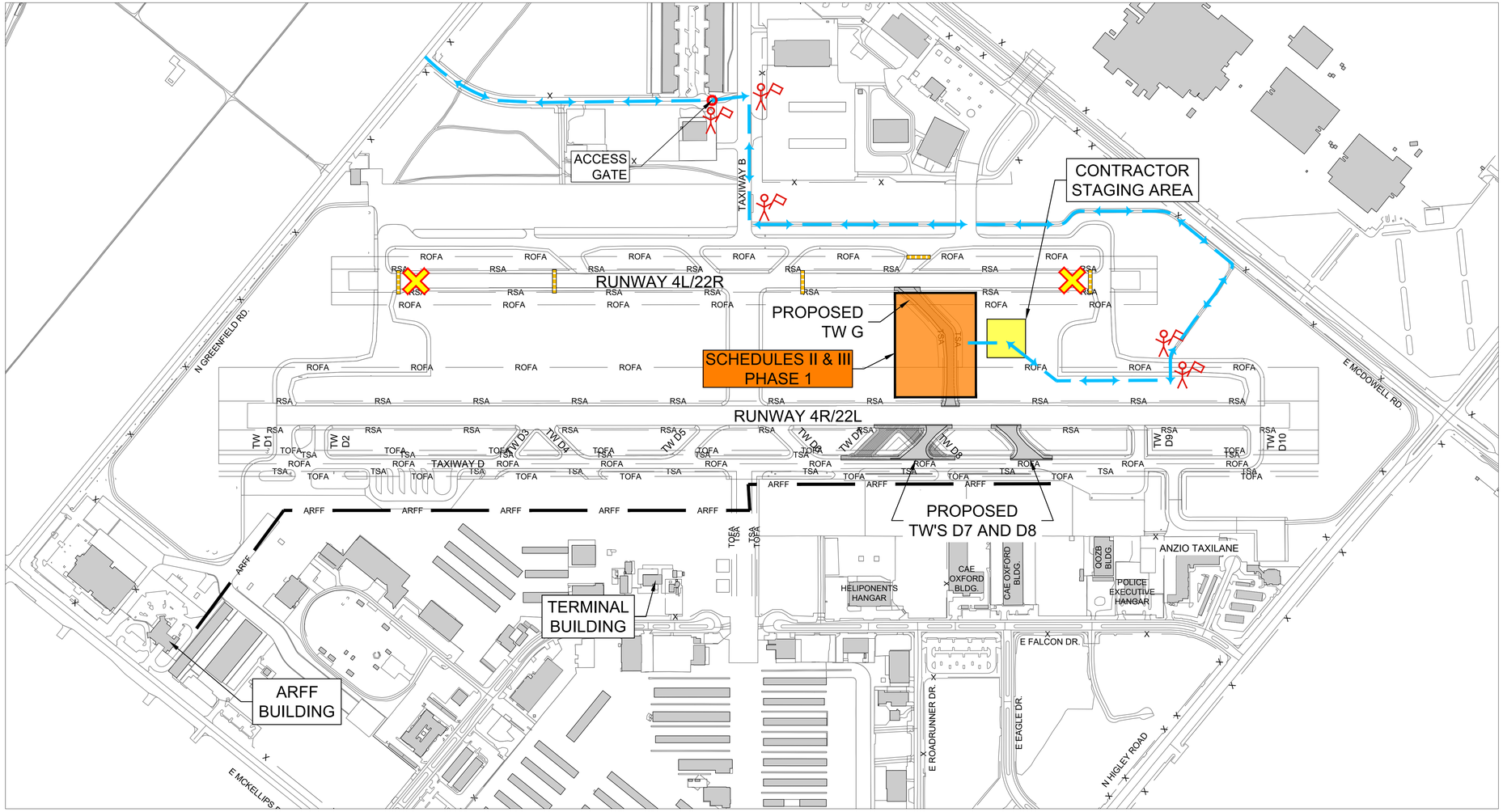
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 9 OF 52

CATALOG NUMBER: A-270528

DATE SAVED: 2/25/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G051-SAFE.DWG



CONSTRUCTION PHASING NOTES

SCHEDULES II & III / PHASE 1

DURATION

65 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

ACCESS TO APPROVED WORK AREAS SHALL BE FROM 6PM TO 6AM.

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

ELECTRICAL
1. ALCMS INSTALLATION

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE II PHASE 1 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE II PHASE 2.
21. ALL WORK FOR SCHEDULE II, PHASE 1 SHALL BE COMPLETED AT NIGHT. ALL NECESSARY LIGHT PLANTS AND OTHER ADDITIONAL SAFETY PRECAUTIONS SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.
22. THE WORK AREA SHALL NOT EXTEND CLOSER TO RUNWAY 4R/22L THAN 80 FEET FROM THE CENTERLINE OF THE RUNWAY, AND CLOSER TO RUNWAY 4L-22R THAN 65 FEET FROM THE CENTERLINE OF THE RUNWAY. THE CONTRACTOR SHALL PLACE STAKES OR OTHER HIGHLY VISIBLE MARKERS APPROVED BY THE RPR/FALCON FIELD AT THE PHASE LIMITS DENOTING THESE AREA, SPACED 5 FEET ON CENTER FOR THE FULL LENGTH OF THE PHASE LIMITS.
23. NO STOCKPILES OR EQUIPMENT SHALL BE LEFT IN THE RUNWAY OBJECT FREE AREA OF EITHER RUNWAY OUTSIDE WORKING HOURS.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS Date Signed 3/29/23 ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING
SCHEDULE II, PHASE 1

DRAWING G052

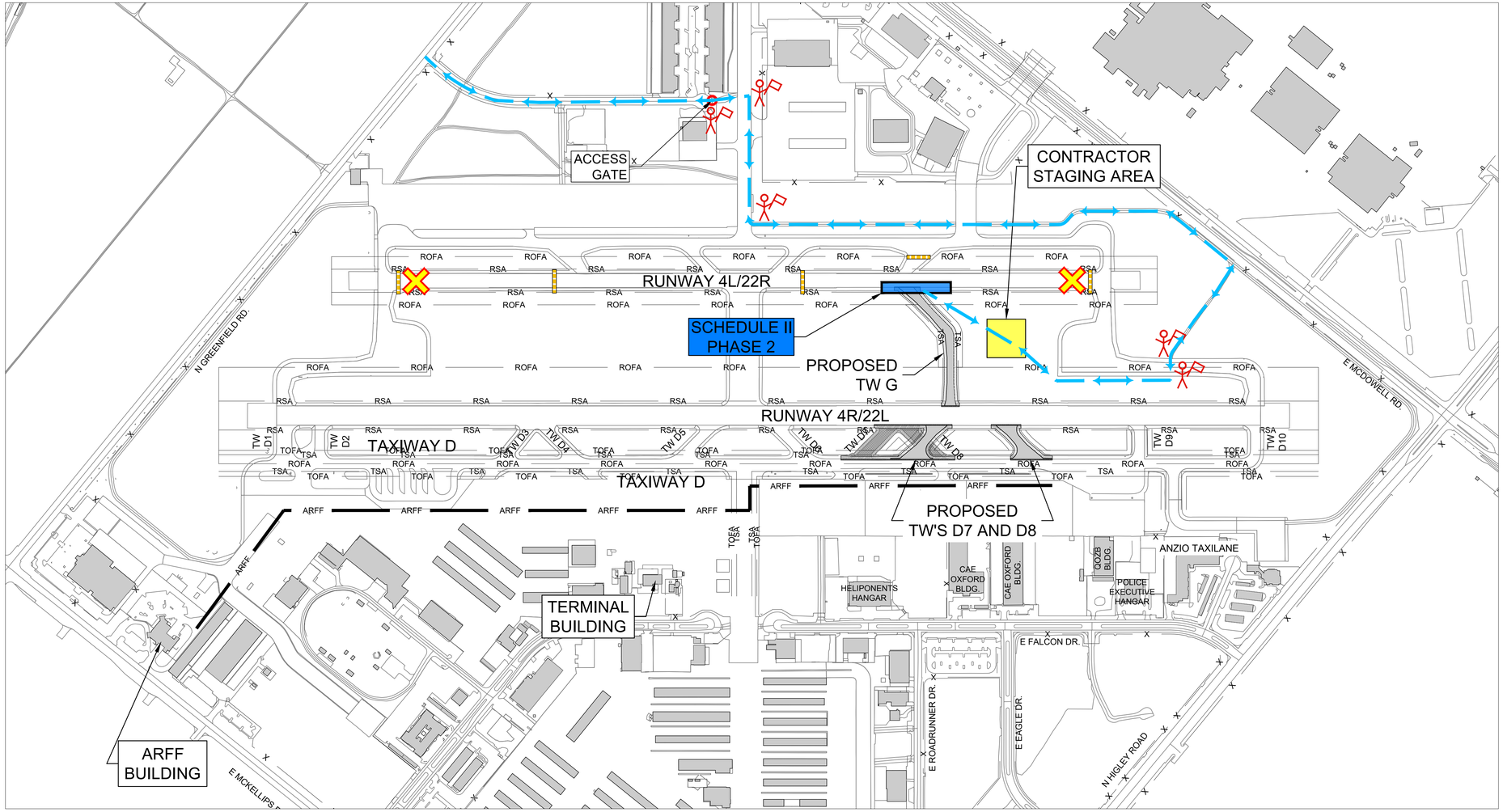
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 10 OF 52

CATALOG NUMBER: A-270529

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G052-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

CONSTRUCTION PHASING NOTES

SCHEDULE II / PHASE 2

DURATION

10 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

24 HOUR ACCESS TO APPROVED WORK AREAS

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- RUNWAY 4L/22R WILL BE CLOSED TO AIRCRAFT OPERATIONS

SCHEDULE II PHASE 2 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE II PHASE 1

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. INSTALL BARRICADES/COVER SIGNS
2. EROSION CONTROL MEASURES
3. PARTIAL DEPTH PAVEMENT REMOVAL

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE II PHASE 2 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE II PHASE 1.

GRAPHIC SCALE
300 0 300 600
(IN FEET)
1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING SCHEDULE II, PHASE 2

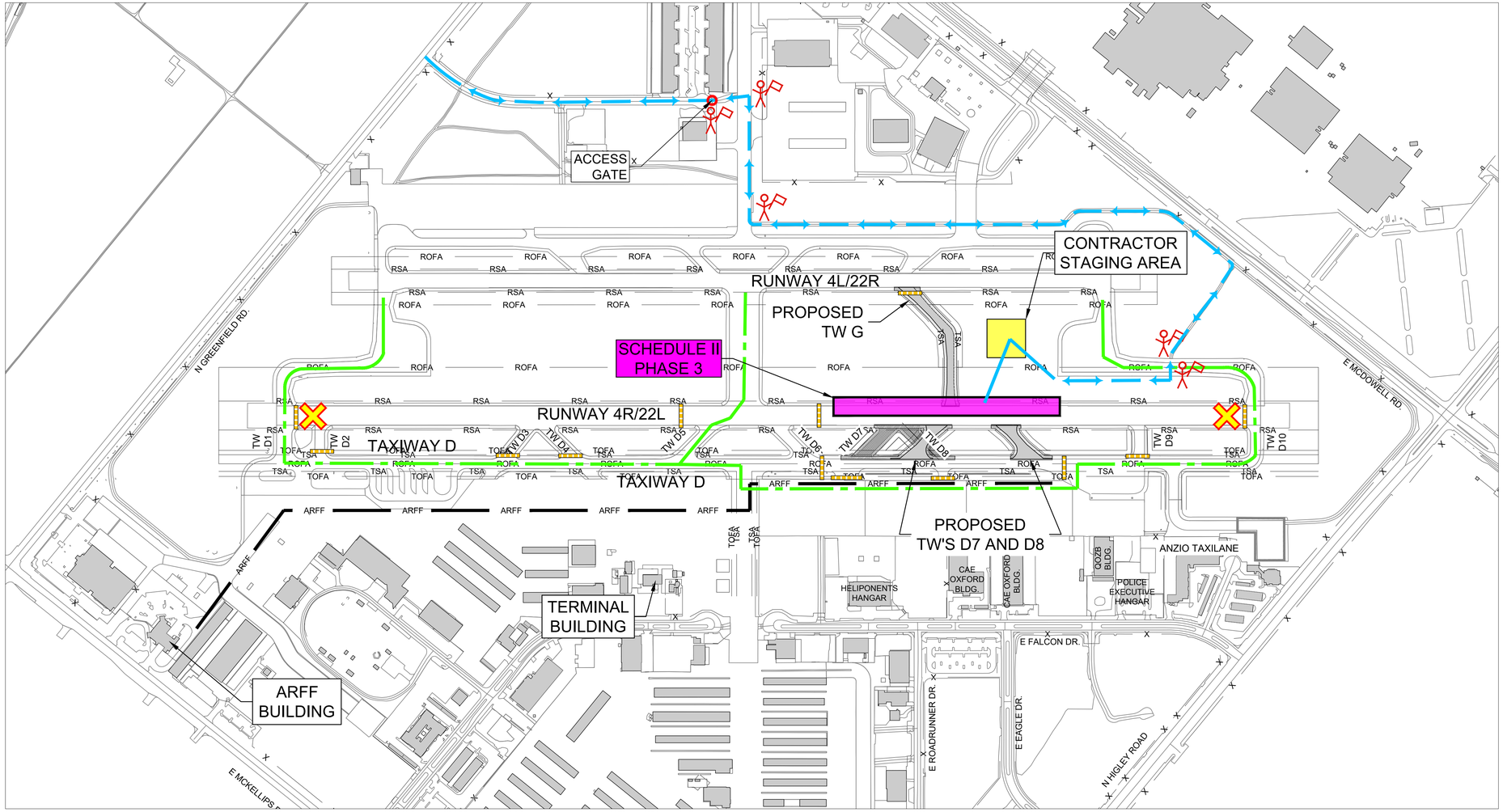
DRAWING G053

SHEET 11 OF 52

CATALOG NUMBER: A-270530

L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G053-PHAS.DWG

DATE SAVED: 3/29/23



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRCRAFT ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

CONSTRUCTION PHASING NOTES

SCHEDULE II / PHASE 3

DURATION

12 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

24 HOUR ACCESS TO APPROVED WORK AREAS

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
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15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE II PHASE 3 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASES 4, 5, AND 6.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING
SCHEDULE II, PHASE 3

DRAWING G054

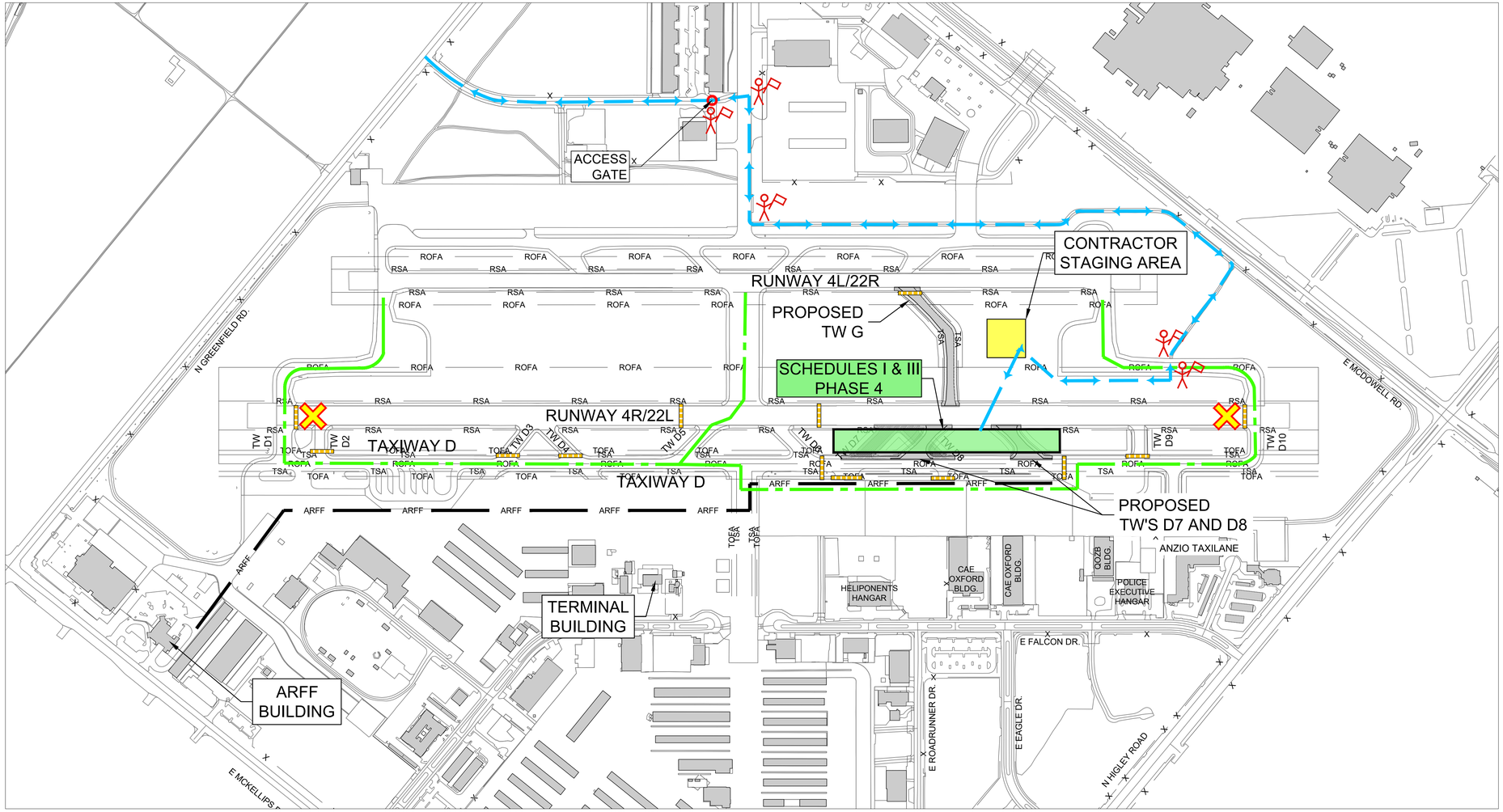
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 12 OF 52

CATALOG NUMBER: A-270531

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G054-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRPLANE HAUL ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS

CONSTRUCTION PHASING NOTES

SCHEDULES I & III / PHASE 4

DURATION

102 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

ACCESS TO APPROVED WORK AREAS SHALL BE FROM 6PM TO 6AM.

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

ELECTRICAL
1. ALCMS INSTALLATION

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE I PHASE 4 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASES 5 AND 6.
21. ALL WORK DURING PHASE 4 THAT IS NOT CONCURRENT WITH SCHEDULE I PHASES 5 SHALL BE COMPLETED AT NIGHT DURING THE SPECIFIED HOURS. NO EQUIPMENT OR STOCKPILES SHALL BE LEFT IN THE PHASE 3 WORK AREA.
22. THE WORK AREA SHALL NOT EXTEND CLOSER TO RUNWAY 4R/22L THAN 80 FEET FROM THE CENTERLINE OF THE RUNWAY, AND CLOSER TO TAXIWAY D THAN 60 FEET FROM THE CENTERLINE OF THE TAXIWAY. THE CONTRACTOR SHALL PLACE STAKES OR OTHER HIGHLY VISIBLE MARKERS APPROVED BY THE RPR/FALCON FIELD AT THE PHASE LIMITS DENOTING THESE AREA, SPACED 5 FEET ON CENTER FOR THE FULL LENGTH OF THE PHASE LIMITS.
21. ALL WORK FOR SCHEDULE I, PHASE 4 SHALL BE COMPLETED AT NIGHT. ALL NECESSARY LIGHT PLANTS AND OTHER ADDITIONAL SAFETY PRECAUTIONS SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 6924 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING
SCHEDULE I, PHASE 4

DRAWING G055

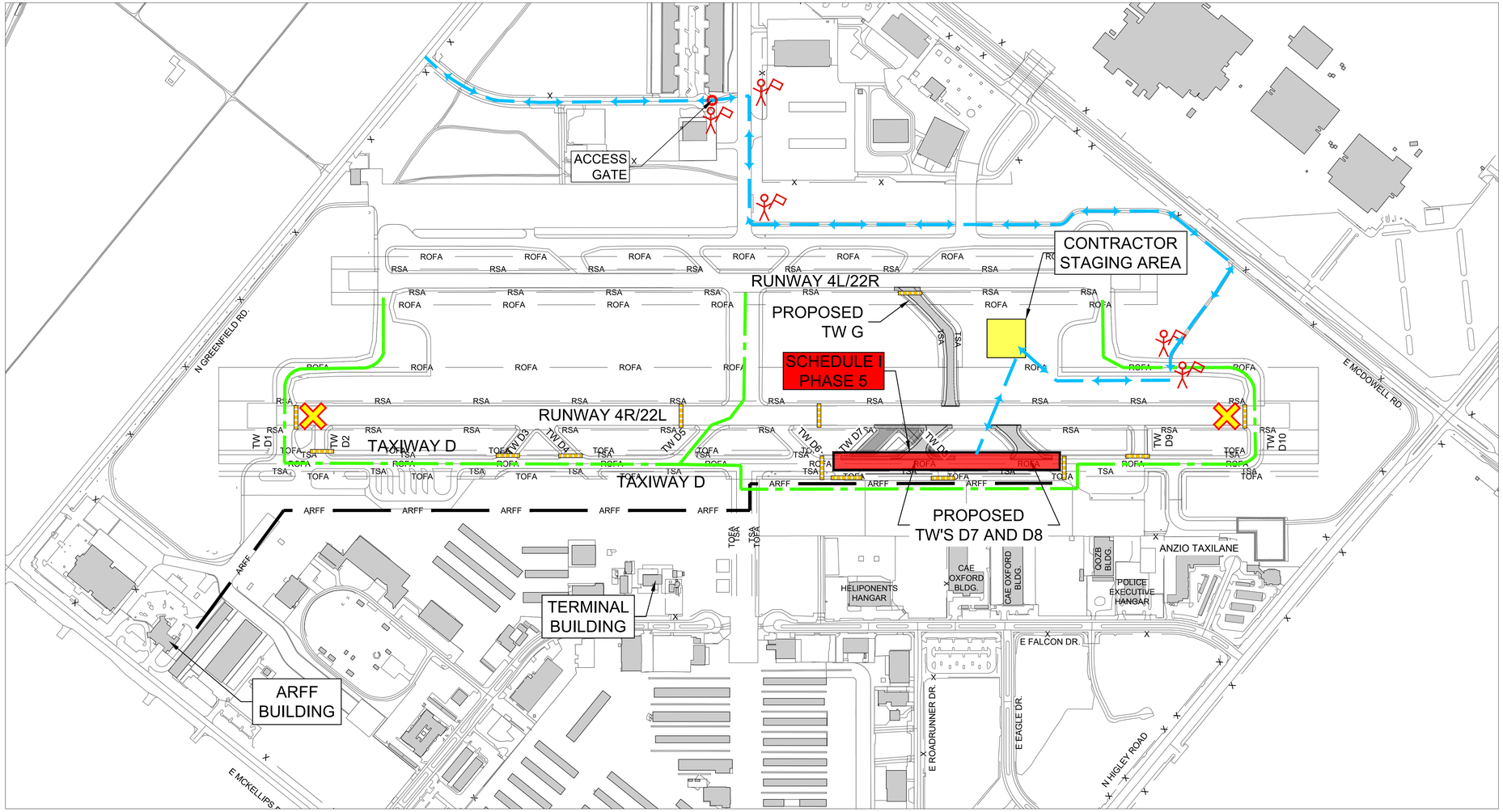
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 13 OF 52

CATALOG NUMBER: A-270532

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G055-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRCRAFT ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS

CONSTRUCTION PHASING NOTES

SCHEDULE I / PHASE 5

DURATION

27 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

ACCESS TO APPROVED WORK AREAS SHALL BE FROM 6PM TO 6AM.

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
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12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE I PHASE 5 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASE 6 AND SCHEDULE II PHASE 3.
21. ALL WORK FOR SCHEDULE I, PHASE 5 SHALL BE COMPLETED AT NIGHT. ALL NECESSARY LIGHT PLANTS AND OTHER ADDITIONAL SAFETY PRECAUTIONS SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69241 JON BRYCE WEEKS Date Signed 3/29/23 ARIZONA, U.S.A.

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

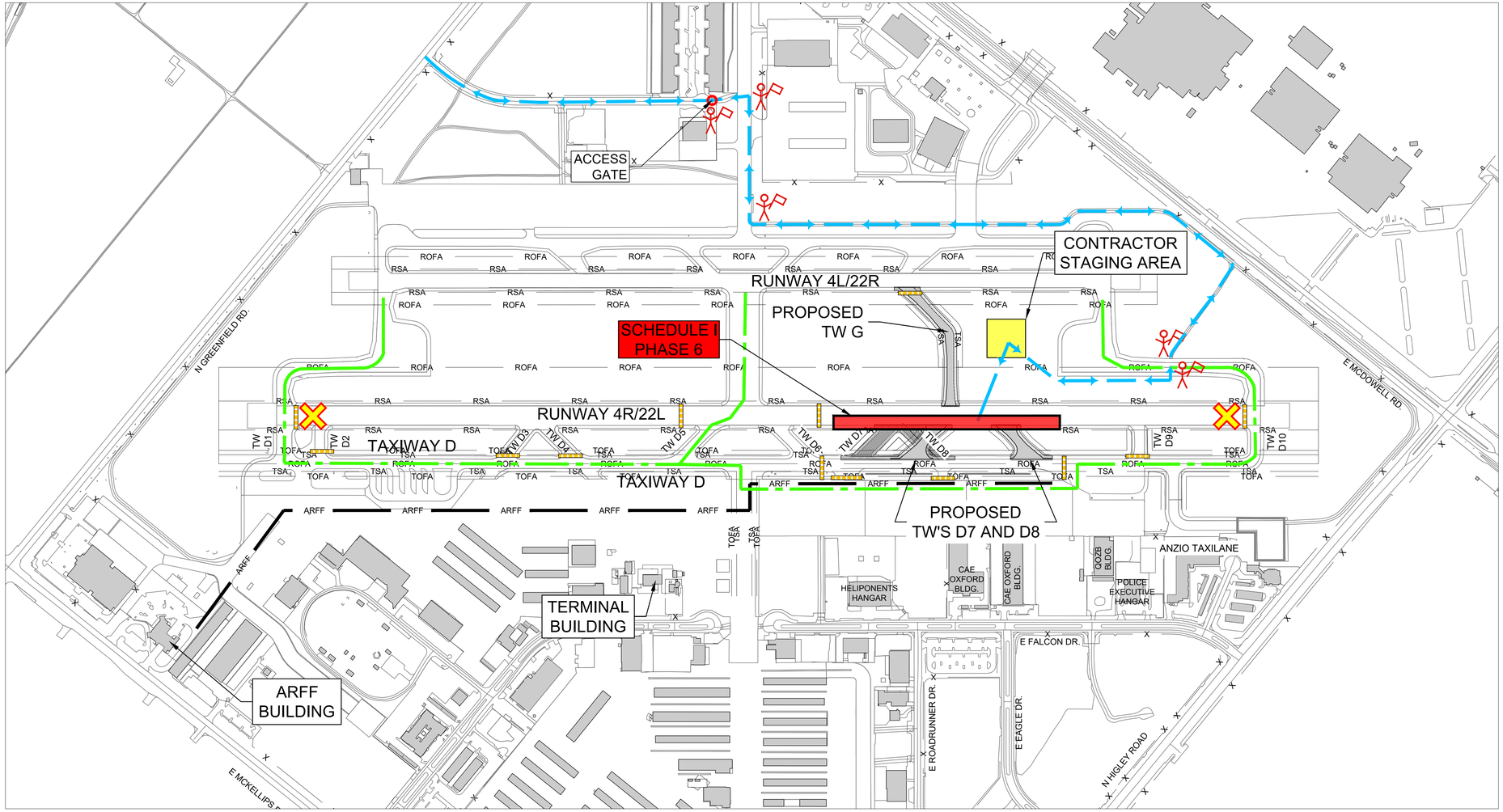
CONSTRUCTION SAFETY DRAWING
SCHEDULE I, PHASE 5

DRAWING G056

SHEET 14 OF 52

CATALOG NUMBER: A-270533

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G056-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AIRCRAFT ROUTE
- RSA — RUNWAY SAFETY AREA
- ROFA — RUNWAY OBJECT FREE AREA
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA
- X — AOA FENCE
- FLASHER BARRICADE
- FLAGGER / GATE GUARD
- CONTRACTOR GATE ACCESS
- RUNWAY CLOSURE X

CONSTRUCTION PHASING NOTES

SCHEDULE I / PHASE 6

DURATION

12 CALENDAR DAYS

CONTRACTOR ACCESS TIMES

24 HOUR ACCESS TO APPROVED WORK AREAS

THE CONTRACTOR MUST SCHEDULE THE PROJECT PHASES TO ENSURE ALL EXISTING RUNWAYS AND TAXIWAYS ARE OPEN TO AIRCRAFT TRAFFIC BETWEEN 11:59 PM NOVEMBER 2, 2023 AND 11:59 PM NOVEMBER 5, 2023. THE CONTRACTOR IS NOT PERMITTED TO WORK DURING THIS TIME PERIOD. THIS TIME PERIOD WILL NOT BE COUNTED AGAINST THE CONTRACTOR'S CONTRACTUAL DAY COUNT FOR THE PROJECT.

ALL AIRPORT OPERATIONS AREAS SHALL REMAIN OPEN AND UNAFFECTED DURING THIS SCHEDULE WITH THE FOLLOWING EXCEPTIONS:

- LIMITS SHOWN WITHIN THE PHASE ARE CLOSED

MAJOR WORK TO BE COMPLETED

SITE PREPARATION
1. EROSION CONTROL MEASURES

EARTHWORK
1. CLEARING AND GRUBBING
2. SUBGRADE PREPARATION
3. OVER EXCAVATION (IF NECESSARY)

PAVEMENT SECTION
1. AGGREGATE BASE COURSE
2. ASPHALT PAVEMENT
3. TEMPORARY PAINT
4. PERMANENT PAINT (AFTER 30 DAY CURE PERIOD)

SITE RECLAMATION
1. SEEDING
2. EROSION CONTROL MEASURES

NOTES

1. THE CONTRACTOR WILL PROVIDE GATE GUARDS AT THE CONTRACTOR ACCESS INTO THE AOA. GATE GUARDS AND FLAGGERS MUST BE BADGED BY THE AIRPORT. ALL COSTS TO PROVIDE GATE GUARDS AND FLAGGERS, INCLUDING BADGING, IS INCIDENTAL TO OTHER PAY ITEMS.
2. THE CONTRACTOR SHALL GIVE RIGHT OF WAY TO ALL AIRCRAFT AND EMERGENCY VEHICLES AT ALL TIMES.
3. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO THE RUNWAY AT ALL TIMES.
4. NO WORK, OPEN EXCAVATIONS, EQUIPMENT, STOCKPILES, OR PERSONNEL ARE ALLOWED IN THE SAFETY AREAS OR OBJECT FREE AREAS FOR ANY ACTIVE TAXIWAY OR SAFETY AREAS FOR AN ACTIVE RUNWAY WHEN THE AIRPORT IS OPEN. ANYTHING LEFT IN THE RUNWAY OBJECT FREE AREA WILL REQUIRE PRIOR APPROVAL FROM FALCON FIELD AND THE RPR.
5. ALL SAFETY AREAS AND OBJECT FREE AREAS FOR ACTIVE AIRPORT PAVEMENTS ARE OFF LIMITS TO THE CONTRACTOR WITHOUT PRIOR APPROVAL FROM AIRPORT OPERATIONS.
6. CONSTRUCTION MARKERS SHALL BE INSTALLED PER PHASING PLANS AND AS REQUIRED BY AC 150/5370-2G OR AS DIRECTED BY THE RPR/FALCON FIELD.
7. ALL STOCKPILES OR EQUIPMENT ADJACENT TO OBJECT FREE AREAS SHALL BE MARKED AND LIGHTED PER AC 150/5370-2G.
8. THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN APPROVED BY THE AIRPORT AND LOCAL JURISDICTION, AND A WORK PLAN FOR THIS SCHEDULE OF WORK.
9. THE CONTRACTOR SHALL HAVE A SWEEPER ON SITE AT ALL TIMES TO CLEAN DEBRIS FROM HAUL ROUTES, CONSTRUCTION ACCESS POINTS, OR AREAS ADJACENT TO CONSTRUCTION. WHEN HAULING MATERIALS AND EQUIPMENT ARE CROSSING THE ACTIVE APRON.
10. THE CONTRACTOR SHALL KEEP ALL CONSTRUCTION TRAFFIC LIMITED TO THE APPROVED HAUL ROUTES AS SHOWN ON THE PLANS OR AS APPROVED BY THE RPR/FALCON FIELD, THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED ALONG THE HAUL ROUTES OR CONSTRUCTION ACCESS ROUTES TO THE PROJECT SITE. HAUL ROADS WILL BE MAINTAINED AND RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO EXPENSE TO THE SPONSOR.
11. PRIOR TO ACCEPTANCE AND OPENING OF AN AREA TO AIRCRAFT, ALL FINAL GRADING MUST BE COMPLETED. THIS INCLUDES, FINE GRADING AND SEED PLACEMENT.
12. ACCESS TO WORK AREAS WILL BE BY HAUL ROUTES ONLY.
13. ANY STRUCTURES, LIGHTS, SIGNS, OR OTHER ITEMS TO REMAIN SHALL BE PROTECTED USING METHODS APPROVED BY THE RPR/FALCON FIELD.
14. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. EDGE LIGHTS IN CLOSED AREAS SHALL BE TURNED OFF USING JUMPERS OR COVERED. ADEQUATE LIGHTING, IN THE OPINION OF THE RPR/FALCON, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. CONTRACTOR METHOD FOR COVERING OF LIGHTS AND SIGNS SHALL BE APPROVED BY RPR/FALCON FIELD. SHALL PREVENT DAMAGE TO THE EQUIPMENT AND SHALL BE SECURED TO PROTECT AGAINST JET BLAST AND MUD.
15. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPERS AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
16. MATERIAL STORAGE WITHIN THE PROJECT LIMITS MUST BE APPROVED BY THE RPR/FALCON FIELD.
17. HAUL ROUTES TO AND FROM THE PROJECT SITE MUST BE APPROVED BY THE RPR/FALCON FIELD.
18. OPERATIONS WITHIN THE AIRPORT OPERATIONS AREA (A.O.A.) MUST BE APPROVED BY THE RPR/FALCON FIELD.
19. SEE SAFETY PLAN FOR SPECIFIC SAFETY REQUIREMENTS.
20. ASPHALT PAVING FOR SCHEDULE I PHASE 6 SHALL BE COMPLETED CONCURRENTLY WITH SCHEDULE I PHASE 5 AND SCHEDULE II PHASE 3.

1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 6924 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

CONSTRUCTION SAFETY DRAWING SCHEDULE I PHASE 6

DRAWING G057

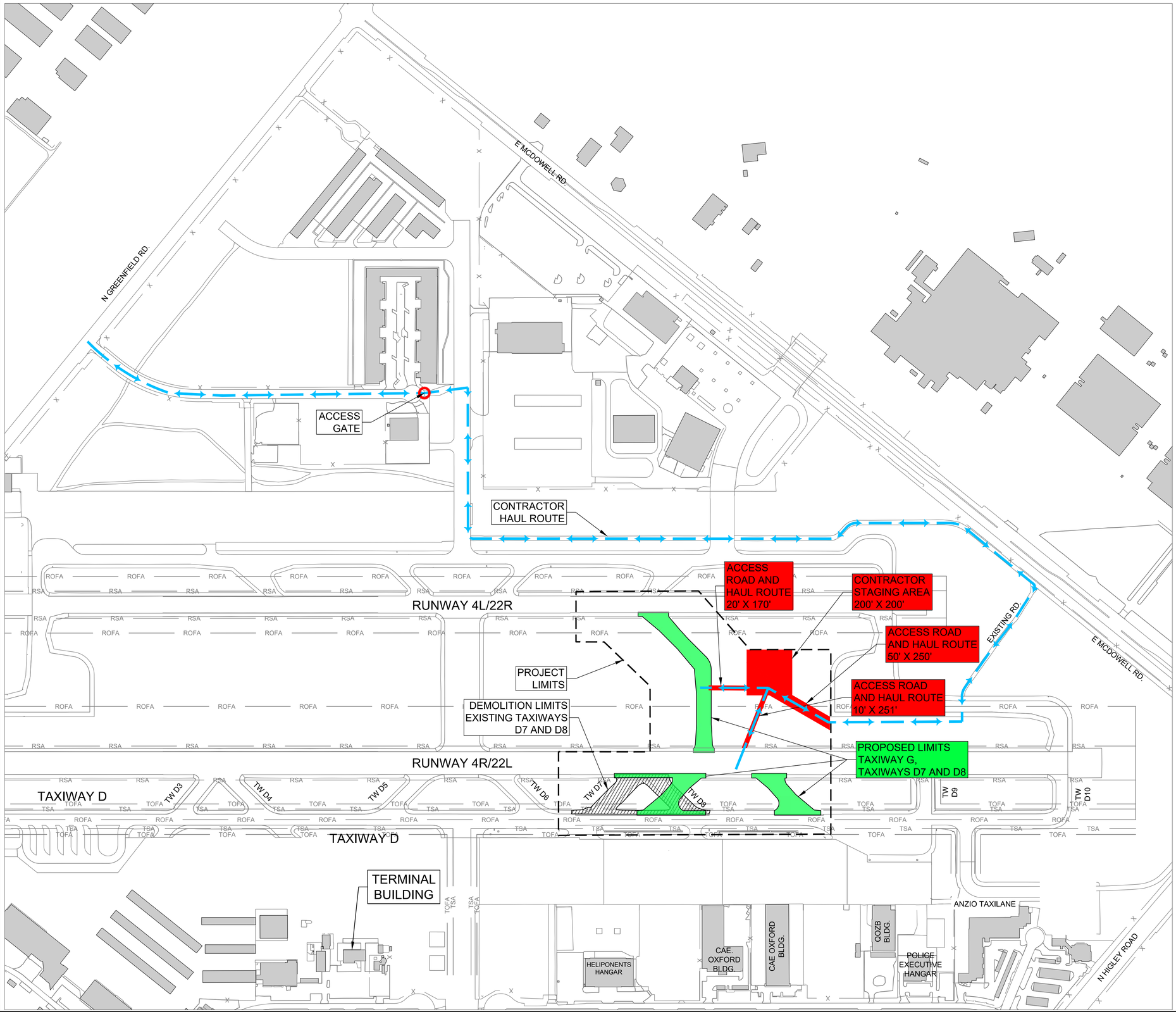
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 15 OF 52

CATALOG NUMBER: A-270534

DATE SAVED: 3/29/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G057-PHAS.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

OVERALL PHASING LEGEND

- CONTRACTOR HAUL ROUTE (2 WAY TRAFFIC)
- AOA FENCE
- CONTRACTOR GATE ACCESS

GRAPHIC SCALE
300 0 300 600
(IN FEET)
1 " = 300' FULL SIZE
1" = 600' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ENVIRONMENTAL PLAN

DRAWING G060

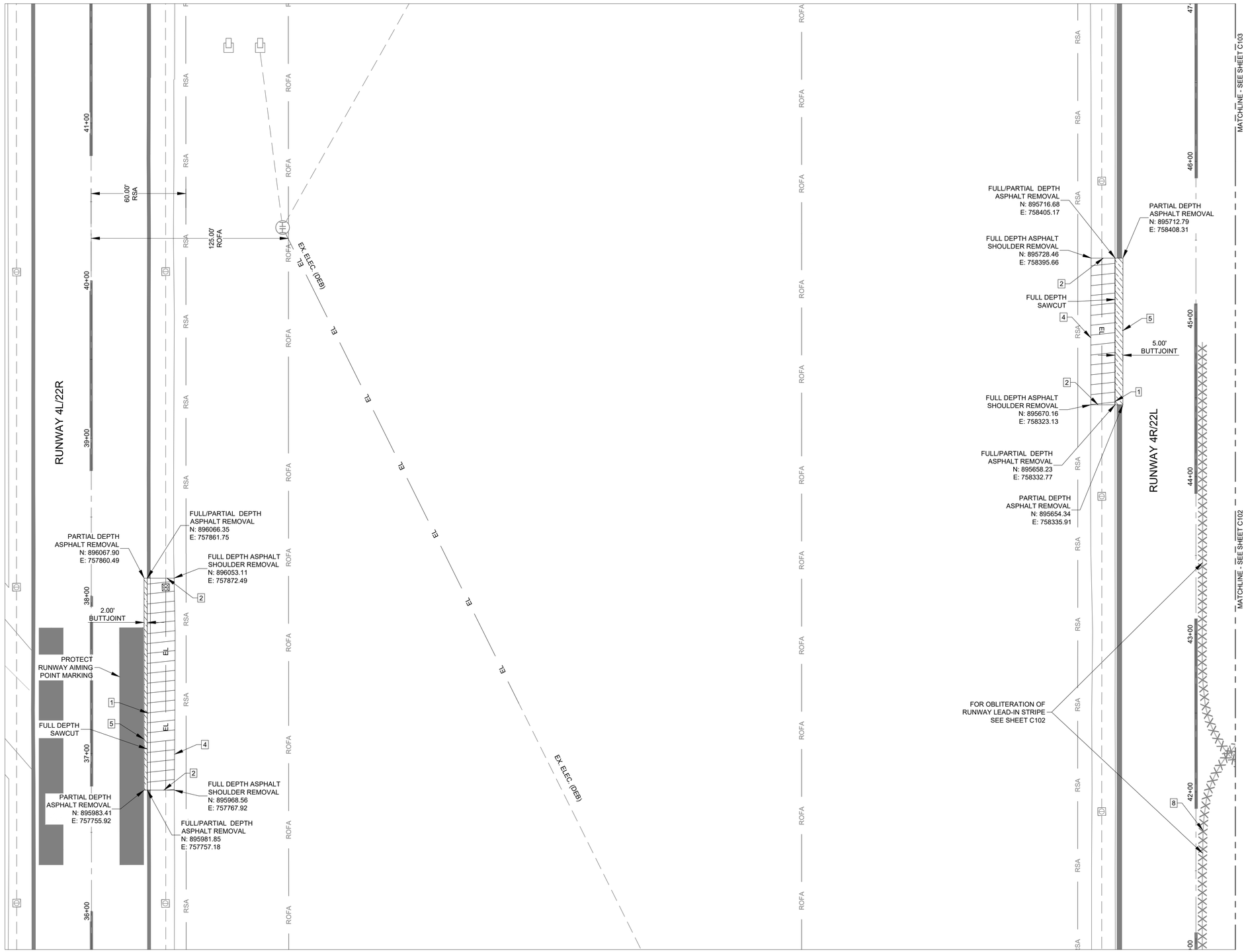
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 16 OF 52

CATALOG NUMBER: A-270535

DATE SAVED: 3/2/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\000-FFZ-MCTE-G060-ENVR.DWG

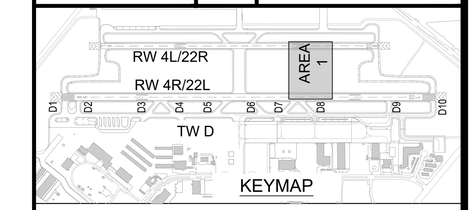


DEMOLITION ITEMS

1	P-101a SAWCUT ASPHALT PAVEMENT (4")	230 LF.
2	P-101b SAWCUT ASPHALT PAVEMENT (2")	65 LF.
4	P-101d ASPHALT PAVEMENT SHOULDER REMOVAL (FULL DEPTH, 2")	440 SY.
5	P-101e ASPHALT PAVEMENT REMOVAL (PARTIAL DEPTH, 2")	85 SY.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



KEYMAP

DEMOLITION LEGEND

- ASPHALT PAVEMENT REMOVAL (FULL DEPTH, 4")
- ASPHALT PAVEMENT SHOULDER REMOVAL (FULL DEPTH, 2")
- ASPHALT PAVEMENT REMOVAL (PARTIAL DEPTH, 2")
- XXXXXXXX — INDICATED REMOVAL / PAINT OBLITERATION ITEMS
- EL — ELECTRICAL LINE TO BE REMOVED
- EL(AB) — ABANDONED ELECTRICAL LINE TO BE REMOVED
- RUNWAY EDGE LIGHT TO BE REMOVED
- TAXIWAY EDGE LIGHT TO BE REMOVED
- JUNCTION BOX TO BE REMOVED
- RUNWAY GUARD LIGHT TO BE REMOVED
- AIRFIELD GUIDANCE SIGN TO BE REMOVED

NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER OFF-SITE DISPOSAL OF ALL WASTE MATERIALS GENERATED FROM THE PROJECT. ALL COSTS ARE INCIDENTAL TO RESPECTIVE REMOVAL BID ITEM.
2. ALL REMOVAL NORTHING AND EASTINGS ARE APPROXIMATE.
3. PAVEMENT REMOVAL SHALL BE MEASURED AND PAID TO NEAT LINE DIMENSIONING.
4. ANY PAVEMENT DAMAGED DURING REMOVAL OUTSIDE THE PROPOSED REMOVAL LIMITS SHALL BE SQUARED OFF, BY SAW CUTTING, TO THE SATISFACTION OF THE RPR. ALL COSTS ASSOCIATED WITH THE ADDITIONAL REMOVAL AND RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. CONTRACTOR SHALL PROTECT ALL UNDERGROUND AND OVERHEAD UTILITIES AT ALL TIMES UNLESS OTHERWISE NOTED. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.
6. ALL ASPHALT REMOVED SHALL BE TAKEN FROM THE AIRPORT PROPERTY AND PROPERLY DISPOSED AT NO ADDITIONAL COST TO THE SPONSOR.
7. IF EXISTING PAVEMENT IS DAMAGED BY HAUL OPERATIONS, THE CONTRACTOR SHALL REPAIR THE PAVEMENT AT NO ADDITIONAL COST TO THE SPONSOR.
8. CONTRACTOR TO SAW CUT ALONG THEORETICAL EDGE TO PRODUCE A CLEAN FACE FOR PAVING. SEE GEOMETRY SHEET C201 - C203 FOR THEORETICAL EDGES.
9. SEE SHEET C650 FOR GENERAL PAINT NOTES AND OBLITERATION NOTES.
10. SEE SHEETS E101 - E103 FOR ADDITIONAL INFORMATION ON ELECTRICAL REMOVAL.
11. PROTECTED UTILITIES ARE TO REMAIN UNDISTURBED. CONTRACTOR TO MILL AND PAVE AROUND, PROTECT UTILITIES MATCHING EXISTING GRADES.
12. CONTRACTOR MAY DISPOSE OF ASPHALT MILLINGS IN A LOCATION APPROVED BY THE AIRPORT REPRESENTATIVE IF SATISFACTORY GRADATION AND UNIFORMITY CAN BE ACHIEVED. OTHERWISE, THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEMOLISHED ASPHALT PAVEMENT AT AN APPROVED OFFSITE LOCATION.
13. CONTRACTOR TO PROTECT ALL PAVEMENT MARKINGS TO REMAIN DURING PAVEMENT MARKING OBLITERATION AT NO COST TO THE AIRPORT.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 53247 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

DEMOLITION PLAN
AREA 1 (SCHEDULE II)

DRAWING C101

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

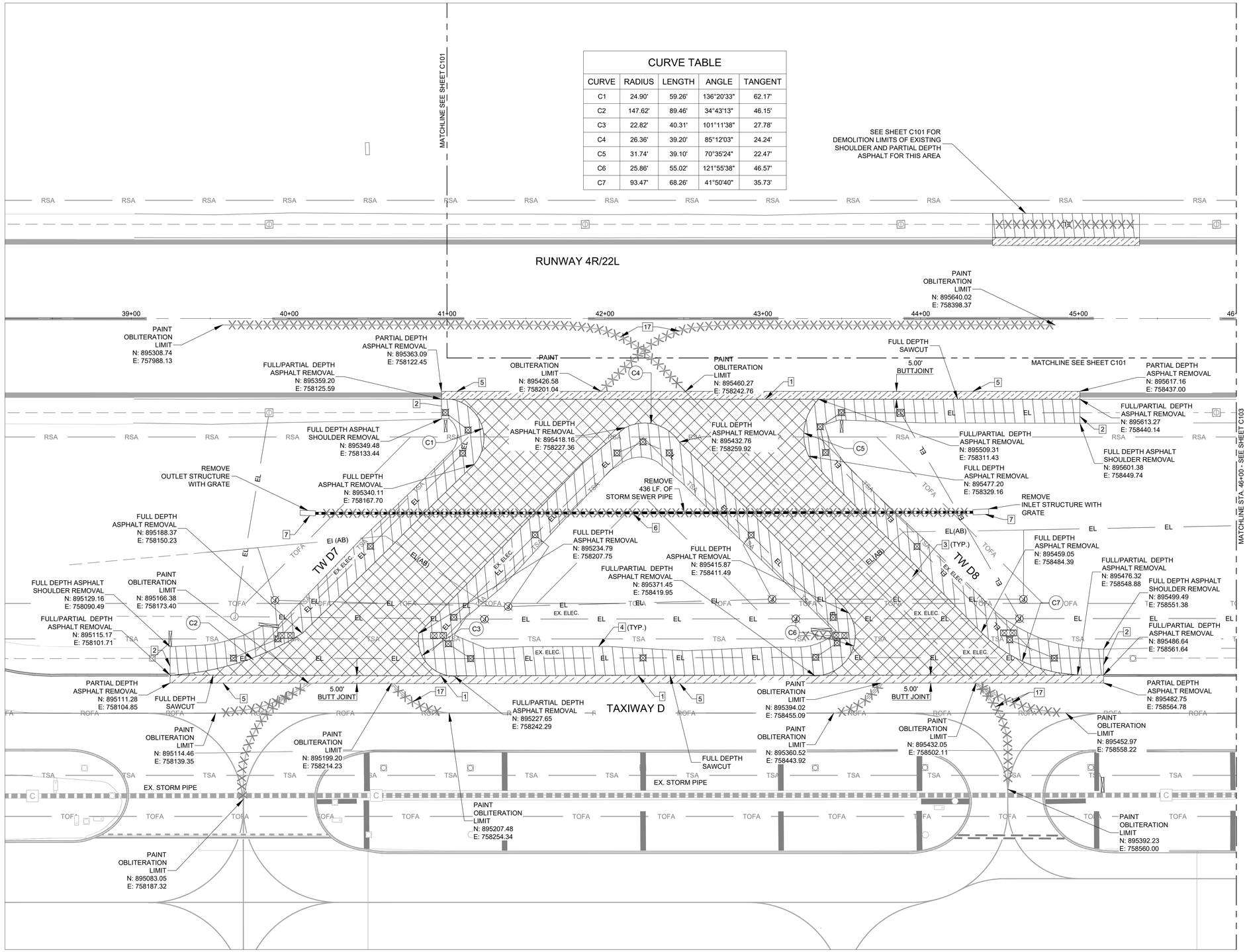
ACTIVITY:
PROJ. NO.: CP0994

SHEET 17 OF 52

CATALOG NUMBER: A-270536

DATE SAVED: 3/31/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\010-FFZ-MCTE-C101-DEMO.DWG

CURVE TABLE				
CURVE	RADIUS	LENGTH	ANGLE	TANGENT
C1	24.90'	59.26'	136°20'33"	62.17'
C2	147.62'	89.46'	34°43'13"	46.15'
C3	22.82'	40.31'	101°11'38"	27.78'
C4	26.36'	39.20'	85°12'03"	24.24'
C5	31.74'	39.10'	70°35'24"	22.47'
C6	25.86'	55.02'	121°55'38"	46.57'
C7	93.47'	68.26'	41°50'40"	35.73'



DEMOLITION ITEMS

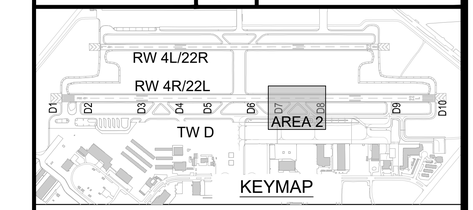
1	P-101a SAWCUT ASPHALT PAVEMENT (4")	995 LF.
2	P-101b SAWCUT ASPHALT PAVEMENT (2")	65 LF.
3	P-101c ASPHALT PAVEMENT REMOVAL (FULL DEPTH, 4")	3,300 SY.
4	P-101d ASPHALT PAVEMENT SHOULDER REMOVAL (FULL DEPTH, 2")	2,560 SY.
5	P-101e ASPHALT PAVEMENT REMOVAL (PARTIAL DEPTH, 2")	580 SY

DEMOLITION ITEMS

6	P-101f REMOVE STORM SEWER PIPE	416 LF.
7	P-101g REMOVE INLET/OUTLET WITH GRATE	2 EA.
17	P-620a SURFACE PREPARATION (OBLITERATION)	580 SF.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



DEMOLITION LEGEND

- ASPHALT PAVEMENT REMOVAL (FULL DEPTH, 4")
- ASPHALT PAVEMENT SHOULDER REMOVAL (FULL DEPTH, 2")
- ASPHALT PAVEMENT REMOVAL (PARTIAL DEPTH, 2")
- XXXXXXXX INDICATED REMOVAL / PAINT OBLITERATION ITEMS
- EL — ELECTRICAL LINE TO BE REMOVED
- EL(AB) — ABANDONED ELECTRICAL LINE TO BE REMOVED
- RUNWAY EDGE LIGHT TO BE REMOVED
- TAXIWAY EDGE LIGHT TO BE REMOVED
- JUNCTION BOX TO BE REMOVED
- RUNWAY GUARD LIGHT TO BE REMOVED
- AIRFIELD GUIDANCE SIGN TO BE REMOVED

NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER OFF-SITE DISPOSAL OF ALL WASTE MATERIALS GENERATED FROM THE PROJECT. ALL COSTS ARE INCIDENTAL TO RESPECTIVE REMOVAL BID ITEM.
2. ALL REMOVAL NORTHING AND EASTINGS ARE APPROXIMATE.
3. PAVEMENT REMOVAL SHALL BE MEASURED AND PAID TO NEAT LINE DIMENSIONING.
4. ANY PAVEMENT DAMAGED DURING REMOVAL OUTSIDE THE PROPOSED REMOVAL LIMITS SHALL BE SQUARED OFF, BY SAW CUTTING, TO THE SATISFACTION OF THE RPR. ALL COSTS ASSOCIATED WITH THE ADDITIONAL REMOVAL AND RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. CONTRACTOR SHALL PROTECT ALL UNDERGROUND AND OVERHEAD UTILITIES AT ALL TIMES UNLESS OTHERWISE NOTED. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.
6. ALL ASPHALT REMOVED SHALL BE TAKEN FROM THE AIRPORT PROPERTY AND PROPERLY DISPOSED AT NO ADDITIONAL COST TO THE SPONSOR.
7. IF EXISTING PAVEMENT IS DAMAGED BY HAUL OPERATIONS, THE CONTRACTOR SHALL REPAIR THE PAVEMENT AT NO ADDITIONAL COST TO THE SPONSOR.
8. CONTRACTOR TO SAW CUT ALONG THEORETICAL EDGE TO PRODUCE A CLEAN FACE FOR PAVING. SEE GEOMETRY SHEET C201 - C203 FOR THEORETICAL EDGES.
9. SEE SHEET C650 FOR GENERAL PAINT NOTES AND OBLITERATION NOTES.
10. SEE SHEETS E101 - E103 FOR ADDITIONAL INFORMATION ON ELECTRICAL REMOVAL.
11. PROTECTED UTILITIES ARE TO REMAIN UNDISTURBED. CONTRACTOR TO MILL AND PAVE AROUND, PROTECT UTILITIES MATCHING EXISTING GRADES.
12. CONTRACTOR MAY DISPOSE OF ASPHALT MILLINGS IN A LOCATION APPROVED BY THE AIRPORT REPRESENTATIVE IF SATISFACTORY GRADATION AND UNIFORMITY CAN BE ACHIEVED. OTHERWISE, THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEMOLISHED ASPHALT PAVEMENT AT AN APPROVED OFFSITE LOCATION.
13. CONTRACTOR TO PROTECT ALL PAVEMENT MARKINGS TO REMAIN DURING PAVEMENT MARKING OBLITERATION AT NO COST TO THE AIRPORT.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 59247 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

DEMOLITION PLAN
AREA 2 (SCHEDULE I)

DRAWING C102

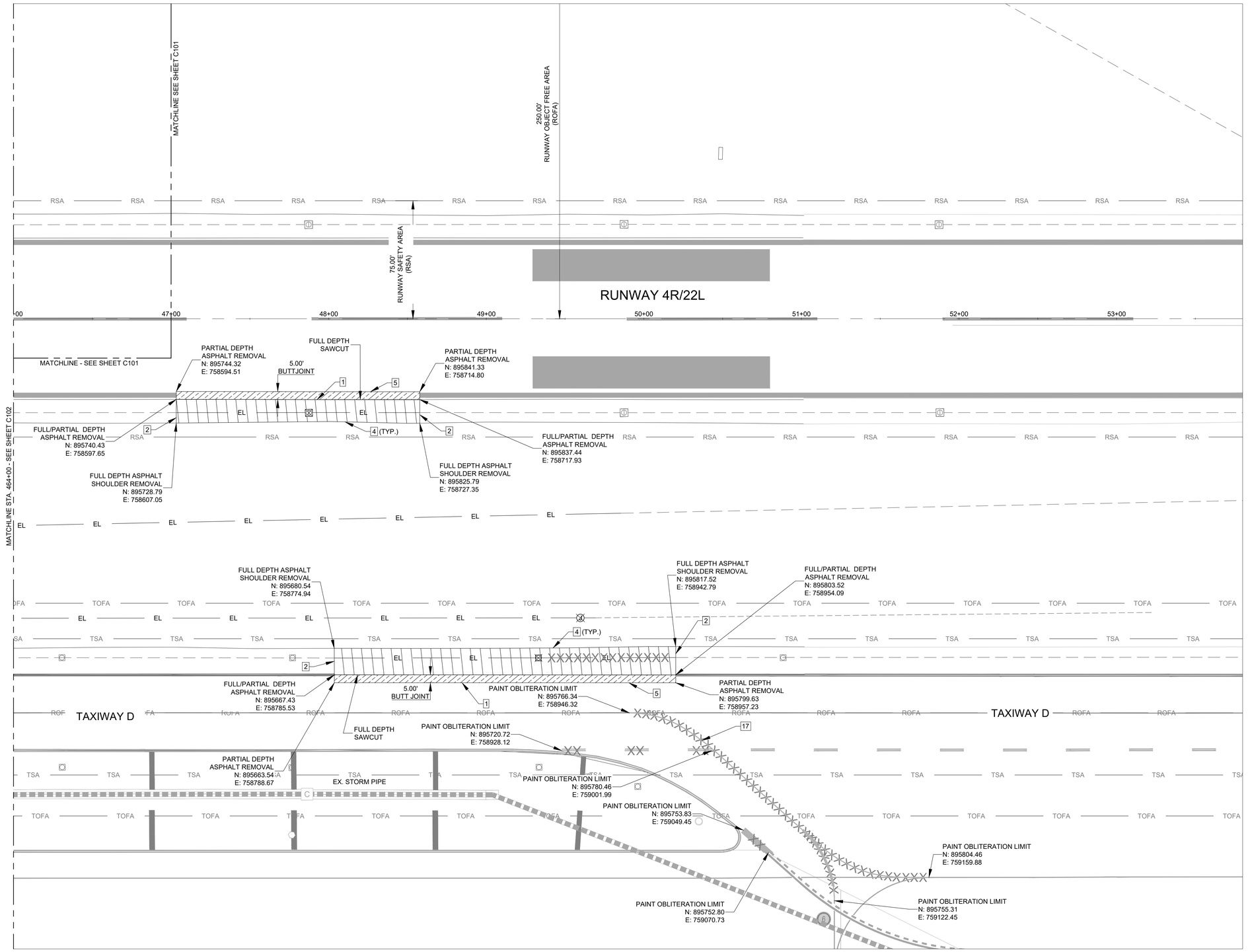
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: ---
PROJ. NO.: CP0994

SHEET 18 OF 52

CATALOG NUMBER: A-270537

DATE SAVED: 3/31/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\010-FFZ-MCTE-C102-DEMO.DWG



DEMOLITION ITEMS

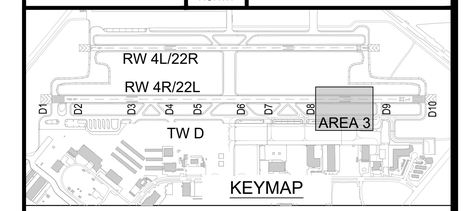
1	P-101a SAWCUT ASPHALT PAVEMENT (4")	375 LF.
2	P-101b SAWCUT ASPHALT PAVEMENT (2")	70 LF.
4	P-101d ASPHALT PAVEMENT SHOULDER REMOVAL (FULL DEPTH, 2")	695 SY.
5	P-101e ASPHALT PAVEMENT REMOVAL (PARTIAL DEPTH, 2")	220 SY.

DEMOLITION ITEMS

17	P-620a SURFACE PREPARATION (OBLITERATION)	275 SF.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



DEMOLITION LEGEND

- ASPHALT PAVEMENT REMOVAL (FULL DEPTH, 4")
- ASPHALT PAVEMENT SHOULDER REMOVAL (FULL DEPTH, 2")
- ASPHALT PAVEMENT REMOVAL (PARTIAL DEPTH, 2")
- XXXXXXXX — INDICATED REMOVAL / PAINT OBLITERATION ITEMS
- EL — ELECTRICAL LINE TO BE REMOVED
- EL(AB) — ABANDONED ELECTRICAL LINE TO BE REMOVED
- RUNWAY EDGE LIGHT TO BE REMOVED
- TAXIWAY EDGE LIGHT TO BE REMOVED
- JUNCTION BOX TO BE REMOVED
- RUNWAY GUARD LIGHT TO BE REMOVED
- AIRFIELD GUIDANCE SIGN TO BE REMOVED

NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER OFF-SITE DISPOSAL OF ALL WASTE MATERIALS GENERATED FROM THE PROJECT. ALL COSTS ARE INCIDENTAL TO RESPECTIVE REMOVAL BID ITEM.
2. ALL REMOVAL NORTHING AND EASTINGS ARE APPROXIMATE.
3. PAVEMENT REMOVAL SHALL BE MEASURED AND PAID TO NEAT LINE DIMENSIONING.
4. ANY PAVEMENT DAMAGED DURING REMOVAL OUTSIDE THE PROPOSED REMOVAL LIMITS SHALL BE SQUARED OFF, BY SAW CUTTING, TO THE SATISFACTION OF THE RPR. ALL COSTS ASSOCIATED WITH THE ADDITIONAL REMOVAL AND RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
5. CONTRACTOR SHALL PROTECT ALL UNDERGROUND AND OVERHEAD UTILITIES AT ALL TIMES UNLESS OTHERWISE NOTED. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.
6. ALL ASPHALT REMOVED SHALL BE TAKEN FROM THE AIRPORT PROPERTY AND PROPERLY DISPOSED AT NO ADDITIONAL COST TO THE SPONSOR.
7. IF EXISTING PAVEMENT IS DAMAGED BY HAUL OPERATIONS, THE CONTRACTOR SHALL REPAIR THE PAVEMENT AT NO ADDITIONAL COST TO THE SPONSOR.
8. CONTRACTOR TO SAW CUT ALONG THEORETICAL EDGE TO PRODUCE A CLEAN FACE FOR PAVING. SEE GEOMETRY SHEET C201 - C203 FOR THEORETICAL EDGES.
9. SEE SHEET C650 FOR GENERAL PAINT NOTES AND OBLITERATION NOTES.
10. SEE SHEETS E101 - E103 FOR ADDITIONAL INFORMATION ON ELECTRICAL REMOVAL.
11. PROTECTED UTILITIES ARE TO REMAIN UNDISTURBED. CONTRACTOR TO MILL AND PAVE AROUND, PROTECT UTILITIES MATCHING EXISTING GRADES.
12. CONTRACTOR MAY DISPOSE OF ASPHALT MILLINGS IN A LOCATION APPROVED BY THE AIRPORT REPRESENTATIVE IF SATISFACTORY GRADATION AND UNIFORMITY CAN BE ACHIEVED. OTHERWISE, THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEMOLISHED ASPHALT PAVEMENT AT AN APPROVED OFFSITE LOCATION.
13. CONTRACTOR TO PROTECT ALL PAVEMENT MARKINGS TO REMAIN DURING PAVEMENT MARKING OBLITERATION AT NO COST TO THE AIRPORT.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS Date Signed 3/29/23 ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

DEMOLITION PLAN
AREA 3 (SCHEDULE I)

DRAWING C103

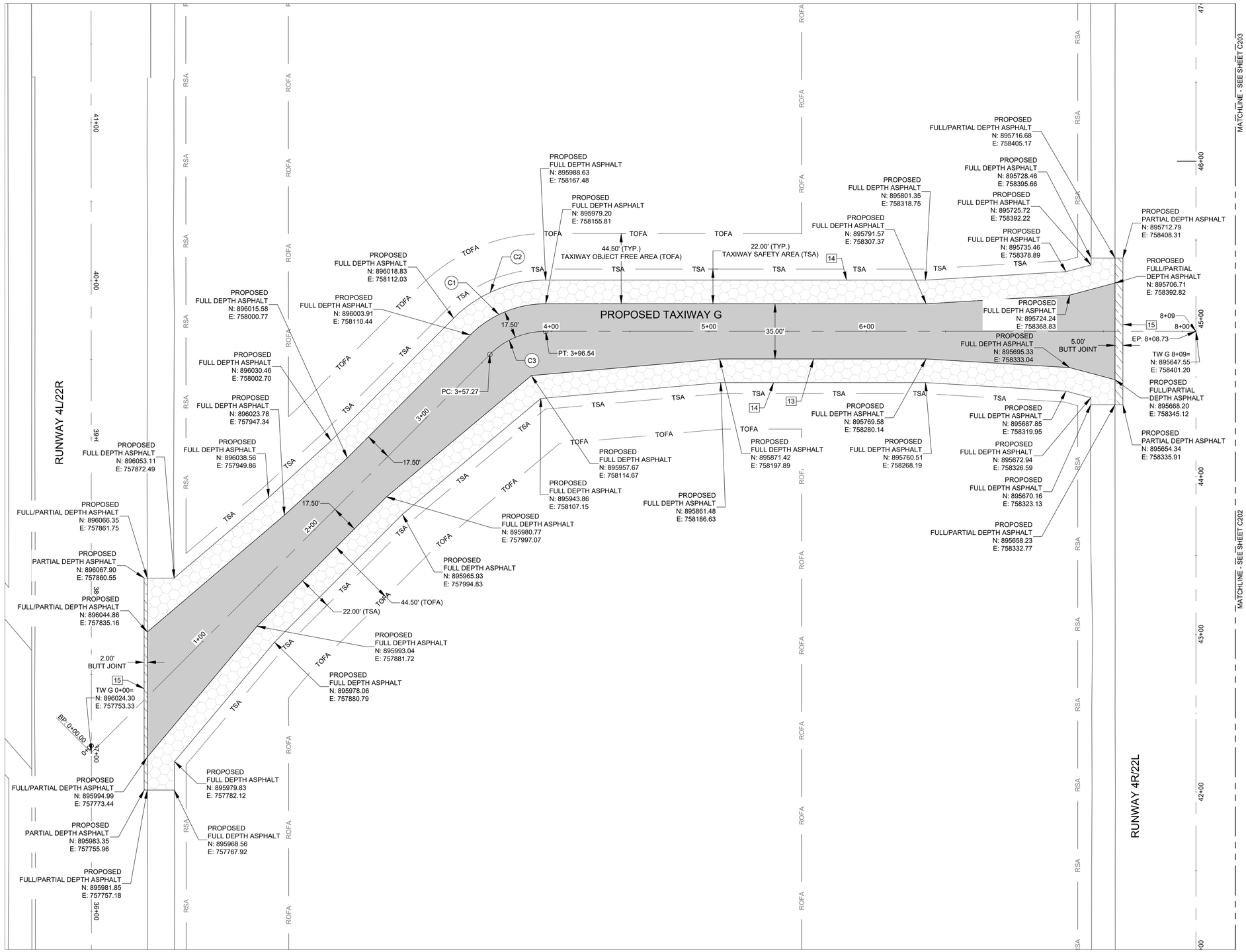
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: ----
PROJ. NO.: CP0994

SHEET 19 OF 52

CATALOG NUMBER: A-270538

DATE SAVED: 3/31/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\010-FFZ-MCTE-C102-DEMO.DWG

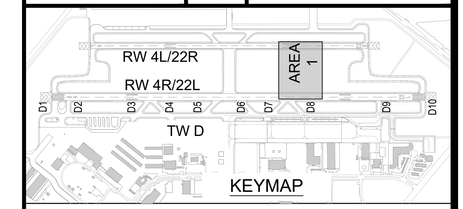


CONSTRUCT ITEMS

11	P-208a AGGREGATE BASE COURSE (6" THICK)	3,480 SY.
12	P-222a SOIL STERILIZATION	5,835 SY.
13	P-401a ASPHALT SURFACE COURSE (3/4" , 4" THICK)	3,325 SY.
14	P-401b ASPHALT SURFACE COURSE (3/4" , 3" THICK)	2,510 SY.
15	P-401c ASPHALT SURFACE COURSE (3/4" , 2" THICK)	85 SY.
16	P-603a EMULSIFIED ASPHALT TACK COAT	340 GAL.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. THE GEOMETRY SHOWN ON THESE SHEETS REPRESENT THEORETICAL PAVEMENT EDGES. UNLESS OTHERWISE DIRECTED BY THE RPR, THE CONTRACTOR SHALL CONSTRUCT THE PAVEMENT SECTION TO THE EXISTING ASPHALT PAVEMENT EDGES.
4. SEE SHEETS G050 - G056 FOR CONSTRUCTION PHASING.
5. SEE SHEETS C220 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C601 - C603 FOR PAVEMENT MARKING INFORMATION.
6. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

CURVE TABLE

CURVE	RADIUS	LENGTH	ANGLE	TANGENT
C1	67.50'	53.01'	44°59'52"	27.96'
C2	82.50'	64.79'	44°59'52"	34.17'
C3	50.00'	39.27'	45°00'00"	20.71'

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 59241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GEOMETRY PLAN
AREA 1 (SCHEDULE II)

DRAWING C201

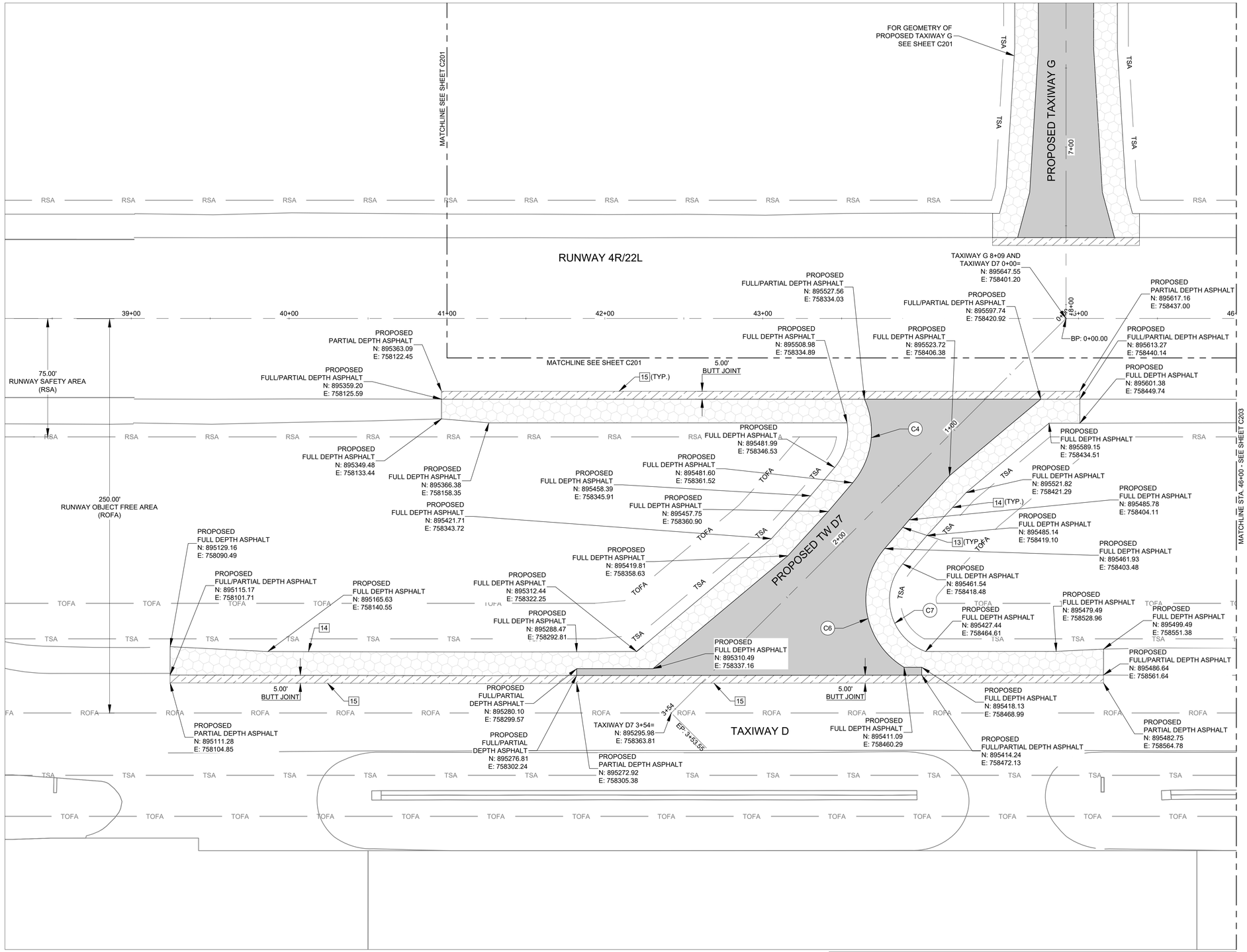
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 20 OF 52

CATALOG NUMBER: A-270539

DATE SAVED: 3/3/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\020-FFZ-MCTE-C201-GMTY.DWG

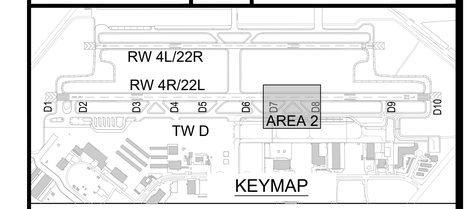


CONSTRUCT ITEMS

11	P-208a AGGREGATE BASE COURSE (6" THICK)	1,780 SY.
12	P-222a SOIL STERILIZATION	3,680 SY.
13	P-401a ASPHALT SURFACE COURSE (3/4" , 4" THICK)	1,715 SY.
14	P-401b ASPHALT SURFACE COURSE (3/4" , 3" THICK)	1,965 SY.
15	P-401c ASPHALT SURFACE COURSE (3/4" , 2" THICK)	580 SY.
16	P-603a EMULSIFIED ASPHALT TACK COAT	230 GAL.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. THE GEOMETRY SHOWN ON THESE SHEETS REPRESENT THEORETICAL PAVEMENT EDGES. UNLESS OTHERWISE DIRECTED BY THE RPR, THE CONTRACTOR SHALL CONSTRUCT THE PAVEMENT SECTION TO THE EXISTING ASPHALT PAVEMENT EDGES.
4. SEE SHEETS G050 - G056 FOR CONSTRUCTION PHASING.
5. SEE SHEETS C220 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C601 - C603 FOR PAVEMENT MARKING INFORMATION.
6. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

CURVE TABLE

CURVE	RADIUS	LENGTH	ANGLE	TANGENT
C4	50.00'	56.52'	64°46'04"	31.71'
C5	35.00'	30.33'	49°38'53"	16.19'
C6	50.00'	86.70'	99°20'43"	58.90'
C7	35.00'	67.23'	110°03'35"	50.04'

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 59247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GEOMETRY PLAN
AREA 2 (SCHEDULE I)

DRAWING C202

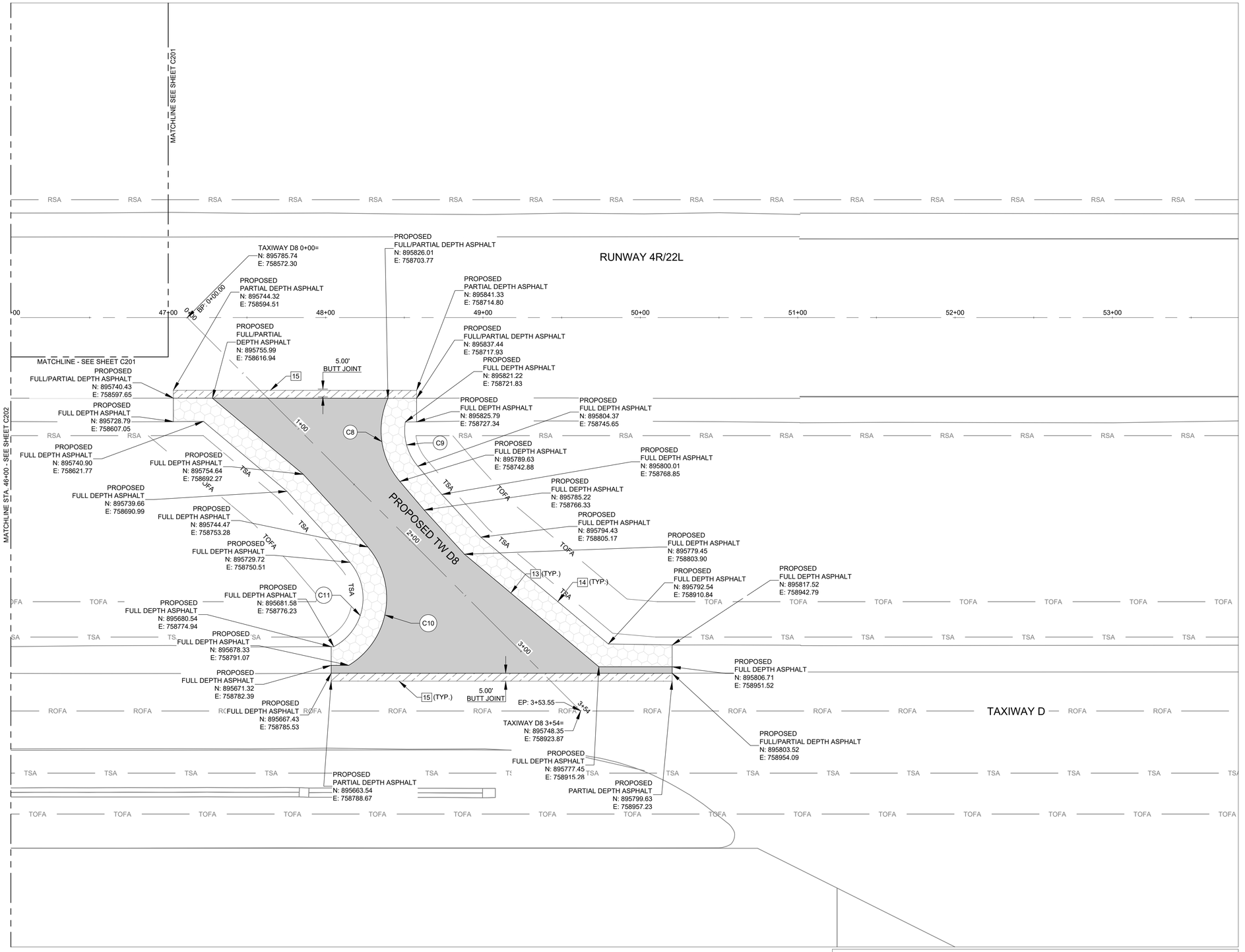
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 21 OF 52

CATALOG NUMBER: A-270540

DATE SAVED: 3/3/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\020-FFZ-MCTE-C202-GMTY.DWG

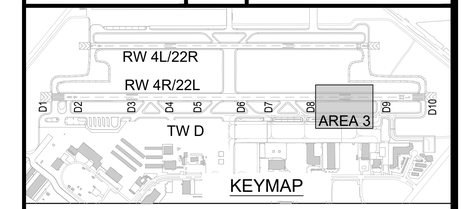


CONSTRUCT ITEMS

11	P-208a AGGREGATE BASE COURSE (6" THICK)	1,770 SY.
12	P-222a SOIL STERILIZATION	2,590 SY.
13	P-401a ASPHALT SURFACE COURSE (3/4" , 4" THICK)	1,710 SY.
14	P-401b ASPHALT SURFACE COURSE (3/4" , 3" THICK)	880 SY.
15	P-401c ASPHALT SURFACE COURSE (3/4" , 2" THICK)	215 SY.
16	P-603a EMULSIFIED ASPHALT TACK COAT	195 GAL.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



GEOMETRY LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT

NOTES

1. CONTRACTOR TO USE SURVEY CONTROL POINTS AS SHOWN ON SHEET G005 SURVEY CONTROL LAYOUT.
2. ALL LINE AND CURVE CALLOUTS ARE AT EDGE OF ASPHALT UNLESS OTHERWISE NOTED.
3. THE GEOMETRY SHOWN ON THESE SHEETS REPRESENT THEORETICAL PAVEMENT EDGES. UNLESS OTHERWISE DIRECTED BY THE RPR, THE CONTRACTOR SHALL CONSTRUCT THE PAVEMENT SECTION TO THE EXISTING ASPHALT PAVEMENT EDGES.
4. SEE SHEETS G050 - G056 FOR CONSTRUCTION PHASING.
5. SEE SHEETS C220 FOR TYPICAL PAVEMENT SECTIONS.
6. SEE SHEETS C601 - C603 FOR PAVEMENT MARKING INFORMATION.
6. ANY PAVEMENT DAMAGE DURING CONSTRUCTION OUTSIDE THE PROPOSED PROJECT REMOVAL LIMITS SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RECONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING UTILITIES.

CURVE TABLE

CURVE	RADIUS	LENGTH	ANGLE	TANGENT
C8	50.00'	56.35'	64°34'41"	31.60'
C9	35.00'	30.10'	49°16'37"	16.05'
C10	50.00'	86.60'	99°14'02"	58.78'
C11	35.00'	62.60'	102°29'08"	43.60'

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE
53247
JON BRYCE WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GEOMETRY PLAN
AREA 3 (SCHEDULE I)

DRAWING C203

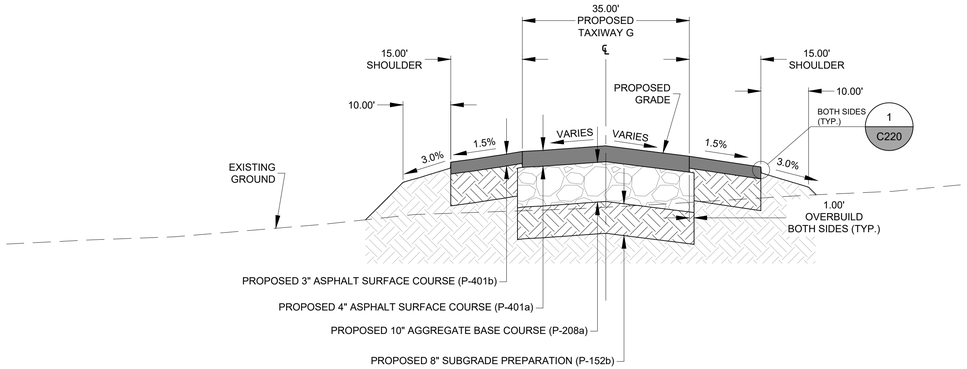
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 22 OF 52

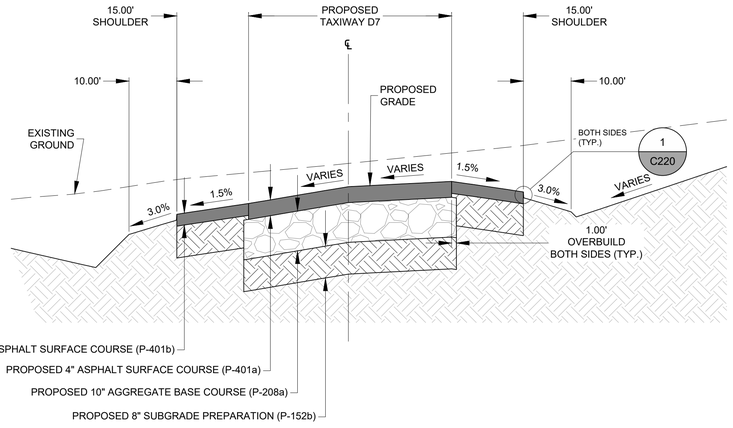
CATALOG NUMBER: A-270541

DATE SAVED: 3/3/23
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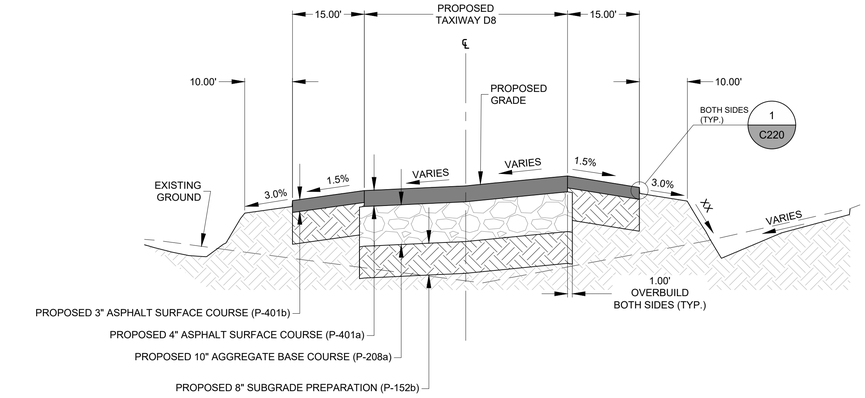
A — TYPICAL SECTION A-A (TAXIWAY G)

Scale: N.T.S.



B — TYPICAL SECTION B-B (TAXIWAY D7)

Scale: N.T.S.

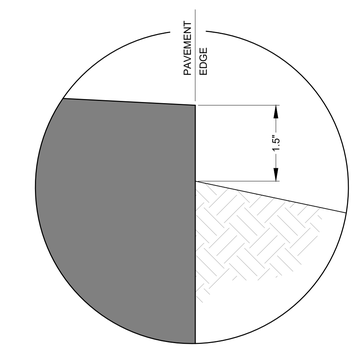


C — TYPICAL SECTION C-C (TAXIWAY D7)

Scale: N.T.S.

NOTES:

1. THE PROPOSED 6" AGGREGATE BASE COURSE IS TO BE OVERBUILT ONE FOOT OUTSIDE OF THE 4" ASPHALT SURFACE COURSE LIMITS.



1 — PAVEMENT DROP OFF DETAIL

Scale: N.T.S.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) — CERTIFICATE — 69247 — JON BRYCE WEEKS — 3/06/23 — Date Signed — ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

TYPICAL SECTIONS

DRAWING: C220

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

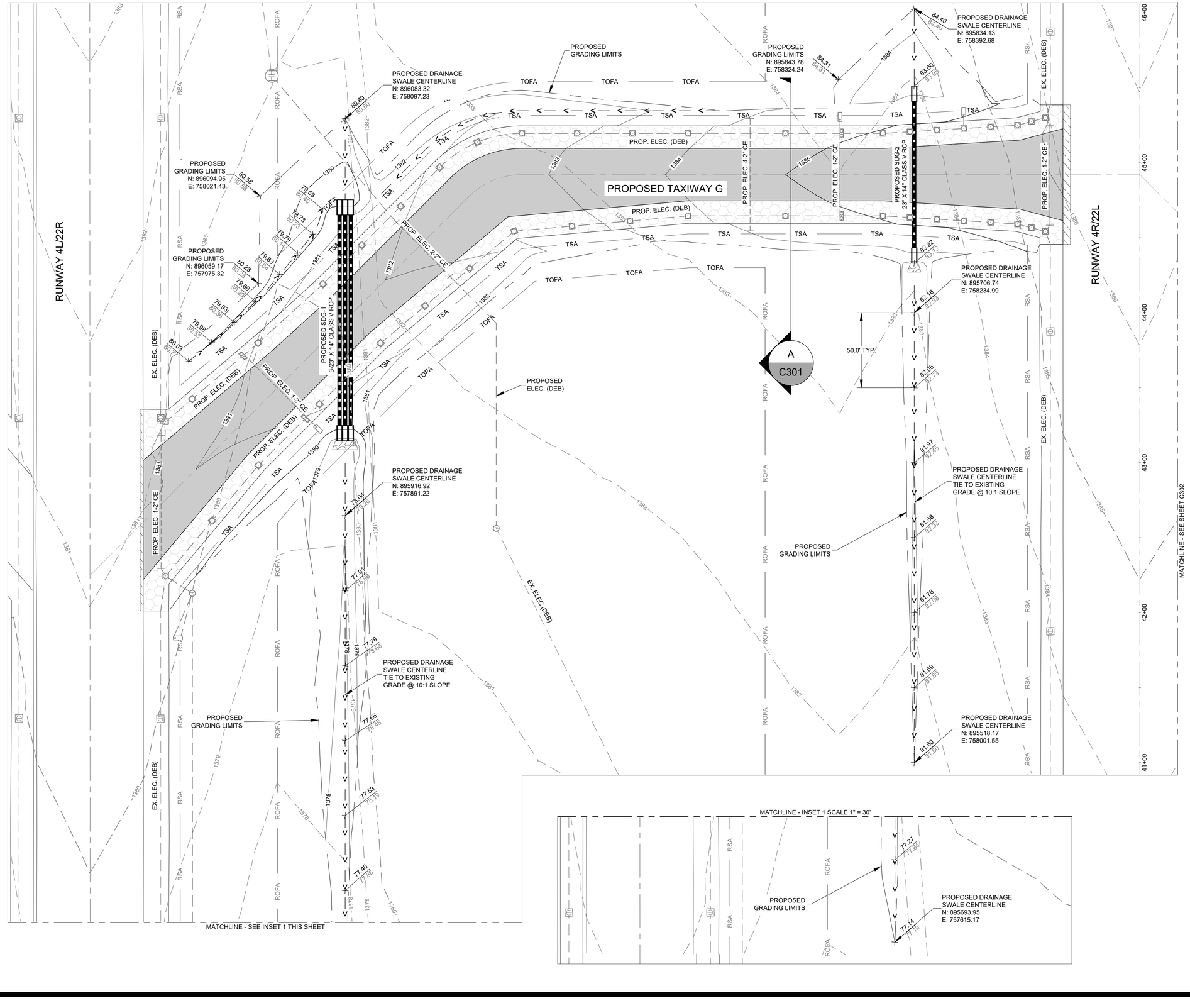
ACTIVITY: _____
PROJ. NO.: CP0994

SHEET: 23 OF 52

CATALOG NUMBER: A-270542

DATE SAVED: 3/3/23

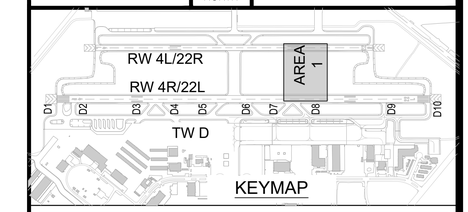
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\022-FFZ-MCTE-C220-TYPS.DWG



NORTH

BENCHMARK:

FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



KEYMAP

GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT
- 1385 — EXISTING INDEX CONTOUR
- 1386 — EXISTING INTERMEDIATE CONTOUR
- 1385 — PROPOSED INDEX CONTOUR
- 1386 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS
- PROPOSED SWALE

NOTES:

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE SPONSOR.
2. CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED BY HIS OPERATIONS OUTSIDE OF THE GRADING LIMITS, INCLUDING ENGINEERED IDENTIFIED STAGING AREAS, STOCKPILES AREAS, AND HAUL ROUTES. ALL RESTORATION SHALL BE AT CONTRACTOR'S EXPENSE AND INCLUDES, BUT IS NOT LIMITED TO, MINOR GRADING, TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
3. CONTRACTOR SHALL USE CAUTION AND PROTECT ALL EXISTING UNDERGROUND UTILITIES.
4. PROPOSED CONTOURS REFLECT FINAL DESIGN ELEVATIONS. IN NON-PAVEMENT AREAS, FINAL ELEVATIONS SHALL INCLUDE DEPTH OF FINAL TOPSOIL LAYER.
5. SEE SHEET C220 FOR TYPICAL SECTIONS.
6. SEE SHEETS C321 - C323 FOR PROPOSED SPOT ELEVATION PLAN.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer — CERTIFICATE — 58247 — JON BRYCE WEEKS — 3/06/23 — Date Signed — ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GRADING AND DRAINAGE PLAN AREA 1 (SCHEDULE II)

DRAWING: C301

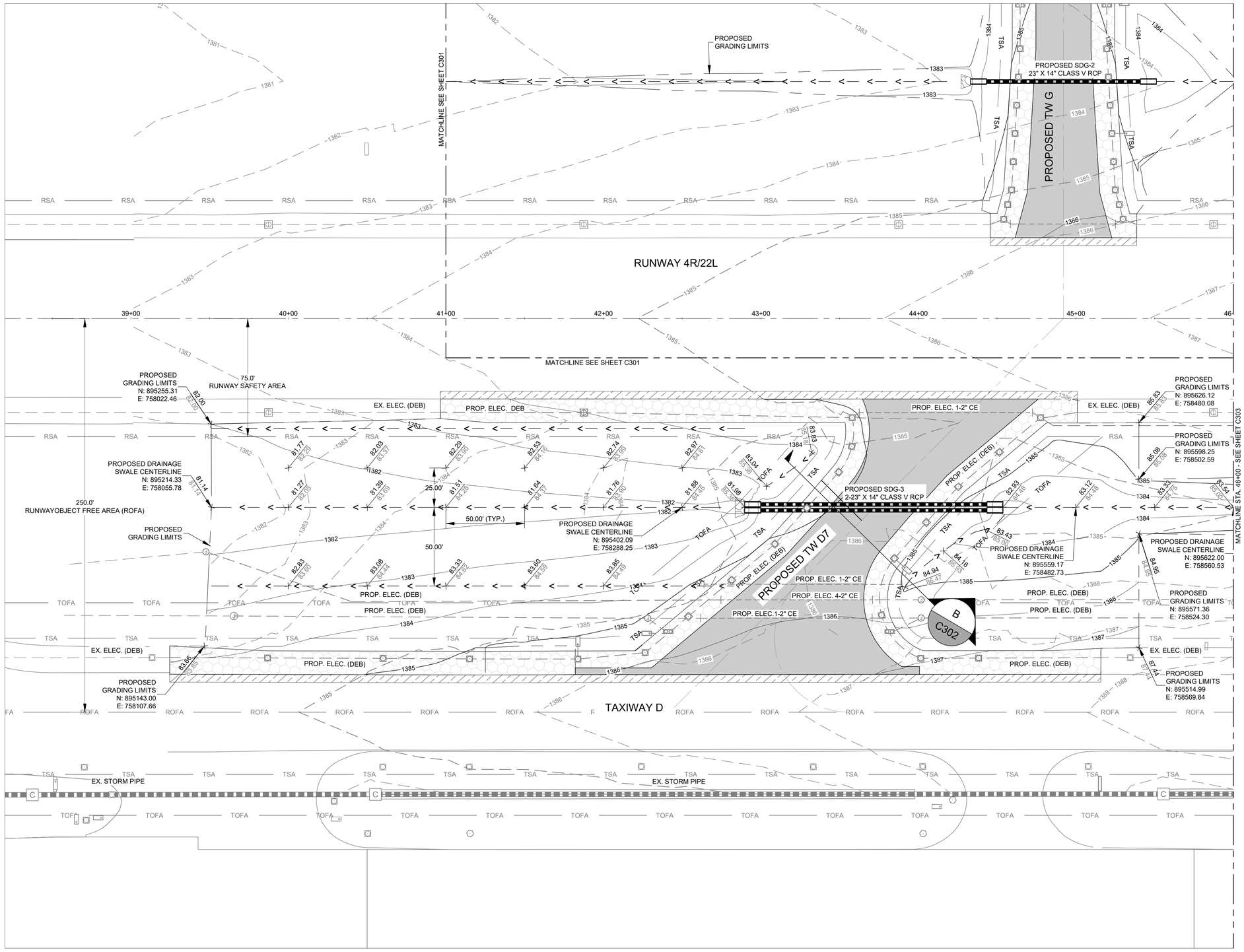
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: _____
PROJ. NO.: CP0994

SHEET: 24 OF 52

CATALOG NUMBER: A-270543

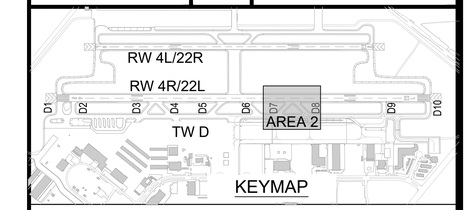
DATE SAVED: 3/8/23
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NORTH

BENCHMARK:

FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



KEYMAP

GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT
- 1385 EXISTING INDEX CONTOUR
- 1386 EXISTING INTERMEDIATE CONTOUR
- 1385 PROPOSED INDEX CONTOUR
- 1386 PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS
- PROPOSED SWALE

NOTES:

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE SPONSOR.
2. CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED BY HIS OPERATIONS OUTSIDE OF THE GRADING LIMITS, INCLUDING ENGINEERED IDENTIFIED STAGING AREAS, STOCKPILES AREAS, AND HAUL ROUTES. ALL RESTORATION SHALL BE AT CONTRACTOR'S EXPENSE AND INCLUDES, BUT IS NOT LIMITED TO, MINOR GRADING, TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
3. CONTRACTOR SHALL USE CAUTION AND PROTECT ALL EXISTING UNDERGROUND UTILITIES.
4. PROPOSED CONTOURS REFLECT FINAL DESIGN ELEVATIONS. IN NON-PAVEMENT AREAS, FINAL ELEVATIONS SHALL INCLUDE DEPTH OF FINAL TOPSOIL LAYER.
5. SEE SHEET C220 FOR TYPICAL SECTIONS.
6. SEE SHEETS C321 - C323 FOR PROPOSED SPOT ELEVATION PLAN.

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GRADING AND DRAINAGE PLAN AREA 2 (SCHEDULE I)

DRAWING C302

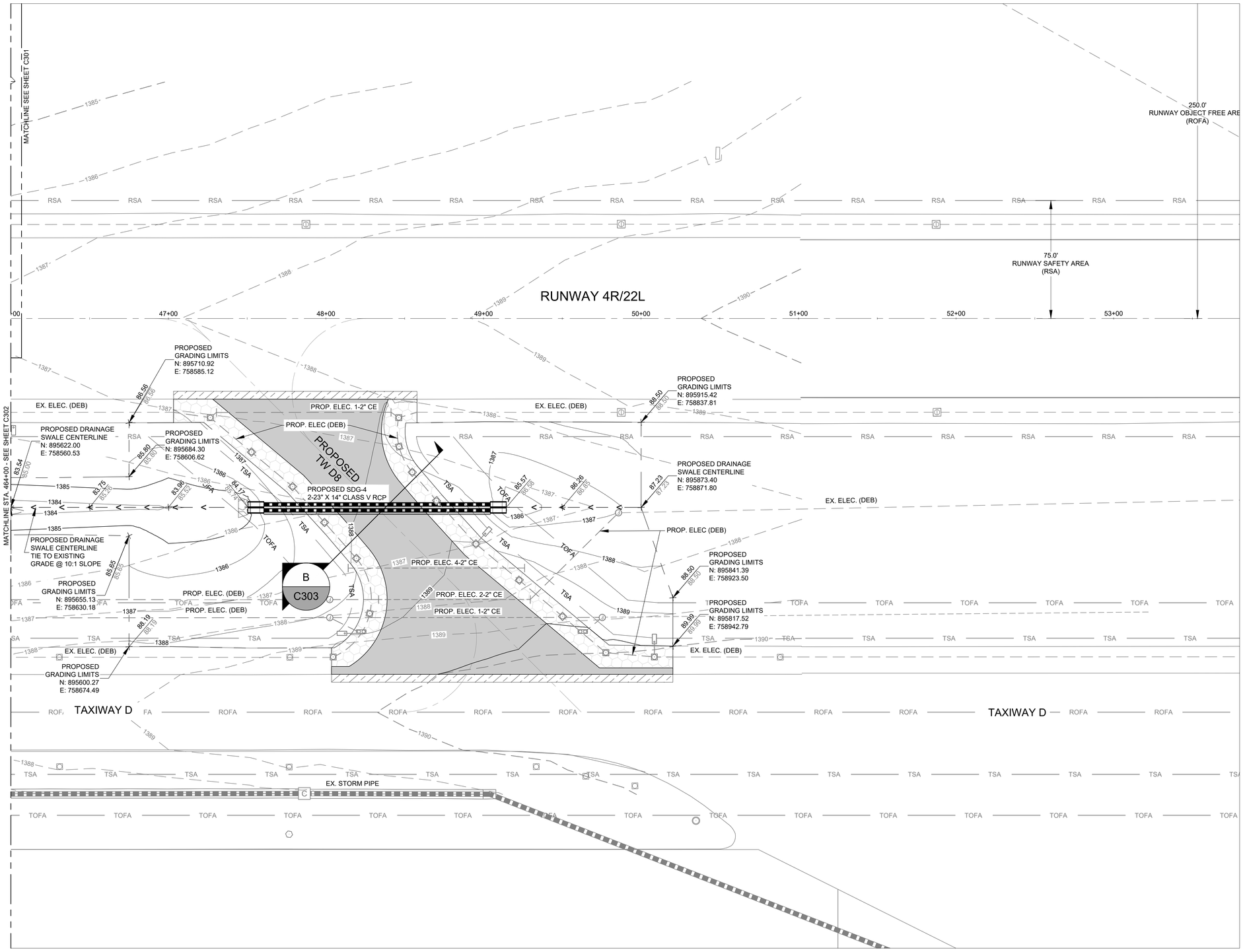
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 25 OF 52

CATALOG NUMBER: A-270544

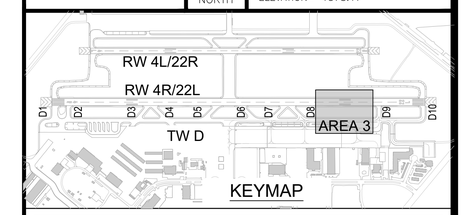
DATE SAVED: 3/10/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\030-FFZ-MCTE-C302-GRAD.DWG



NORTH

BENCHMARK:

FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



GRADING LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT
- 1385 EXISTING INDEX CONTOUR
- 1386 EXISTING INTERMEDIATE CONTOUR
- 1385 PROPOSED INDEX CONTOUR
- 1386 PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS
- PROPOSED SWALE

NOTES:

1. LIMITS OF GRADING ARE APPROXIMATE AND DO NOT CONSTITUTE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS AT NO ADDITIONAL COST TO THE SPONSOR.
2. CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED BY HIS OPERATIONS OUTSIDE OF THE GRADING LIMITS, INCLUDING ENGINEERED IDENTIFIED STAGING AREAS, STOCKPILES AREAS, AND HAUL ROUTES. ALL RESTORATION SHALL BE AT CONTRACTOR'S EXPENSE AND INCLUDES, BUT IS NOT LIMITED TO, MINOR GRADING, TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
3. CONTRACTOR SHALL USE CAUTION AND PROTECT ALL EXISTING UNDERGROUND UTILITIES.
4. PROPOSED CONTOURS REFLECT FINAL DESIGN ELEVATIONS. IN NON-PAVEMENT AREAS, FINAL ELEVATIONS SHALL INCLUDE DEPTH OF FINAL TOPSOIL LAYER.
5. SEE SHEET C220 FOR TYPICAL SECTIONS.
6. SEE SHEETS C321 - C323 FOR PROPOSED SPOT ELEVATION PLAN.

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer - Civil
CERTIFICATE NO.
59247
JON BRYCE
WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

GRADING AND
DRAINAGE PLAN
AREA 3 (SCHEDULE I)

DRAWING
C303

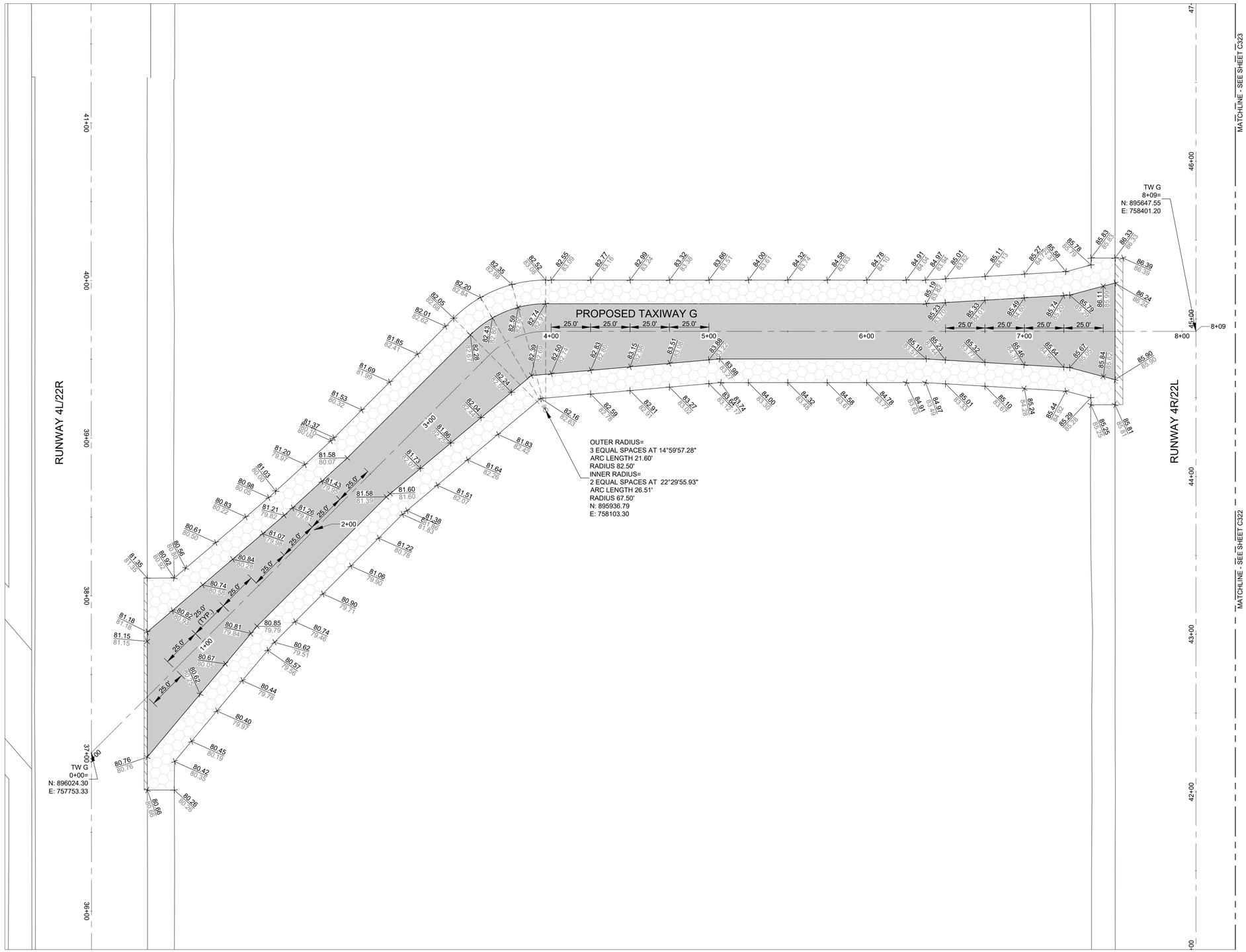
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET
26 OF 52

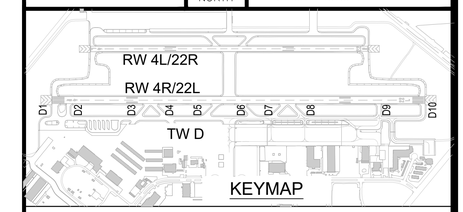
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A-270545

DATE SAVED: 3/10/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\039-FFZ-MCTE-C302-GRAD.DWG



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



SPOT ELEVATION LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT
- 1384.40 / 1384.38 — DESIGN ELEVATION / EXISTING ELEVATION

NOTES:

1. ALL SPOT ELEVATIONS ARE AT FINISHED PAVEMENT GRADE UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE SHEET C220 - C303 FOR TYPICAL SECTIONS.
4. SEE SHEETS C301 - C303 FOR GRADING.
5. SEE SHEETS C400 AND C401. FOR TAXIWAY H, D7 AND D8 PLAN AND PROFILES.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE NO.
59241
JON BRYCE WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

SPOT ELEVATION PLAN
AREA 1 (SCHEDULE II)

DRAWING: C321

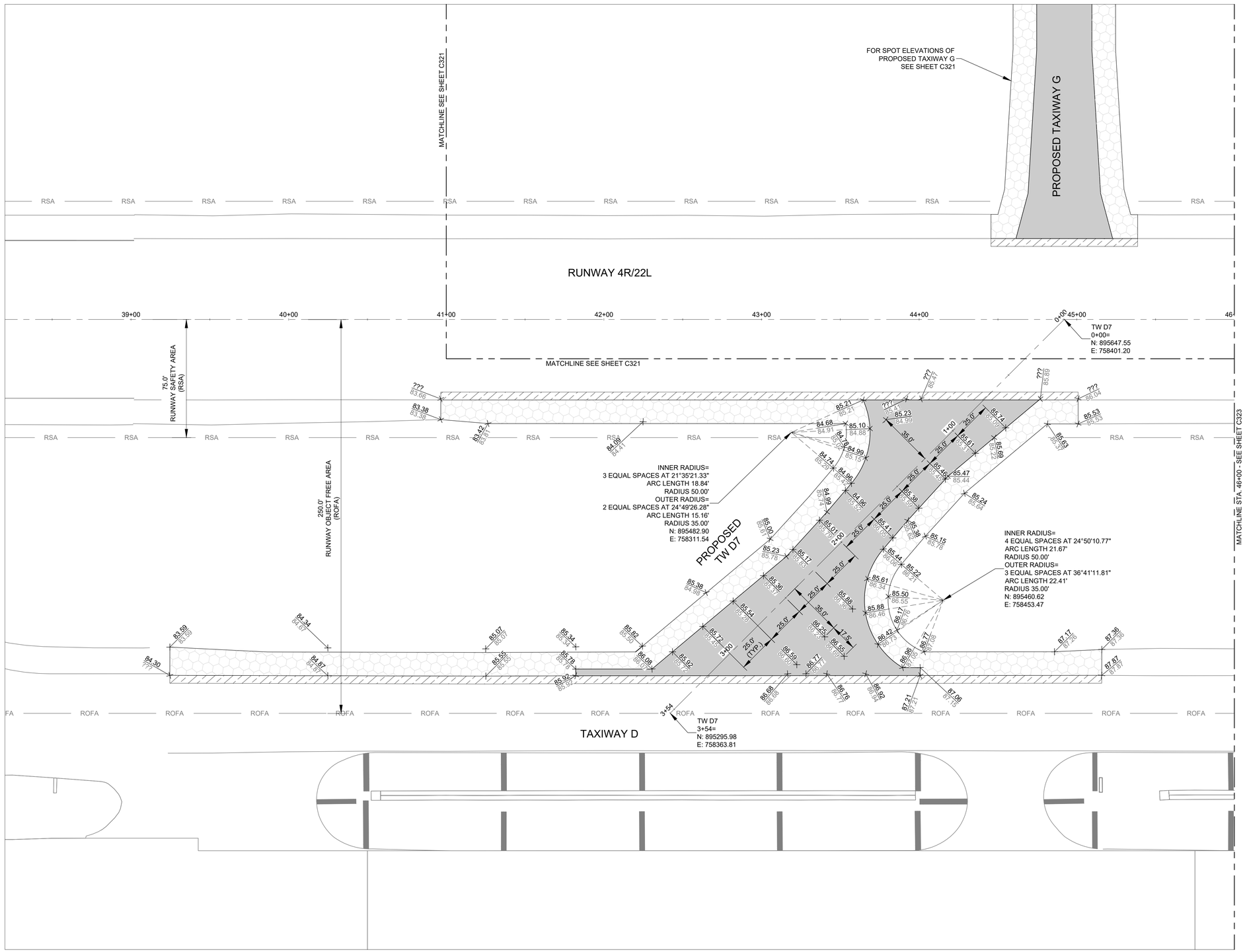
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET: 27 OF 52

CATALOG NUMBER: A-270546

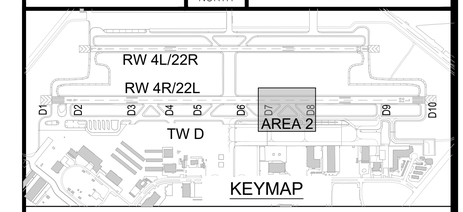
DATE SAVED: 3/2/23
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NORTH

BENCHMARK:

FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



SPOT ELEVATION LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT
- 1384.40 / 1384.38 — DESIGN ELEVATION / EXISTING ELEVATION

NOTES:

1. ALL SPOT ELEVATIONS ARE AT FINISHED PAVEMENT GRADE UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE SHEET C220 - C303 FOR TYPICAL SECTIONS.
4. SEE SHEETS C301 - C303 FOR GRADING.
5. SEE SHEETS C400 AND C401. FOR TAXIWAY H, D7 AND D8 PLAN AND PROFILES.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 25' FULL SIZE
1" = 50' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE
69247
JON BRYCE WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

SPOT ELEVATION PLAN
AREA 2 (SCHEDULE I)

DRAWING C322

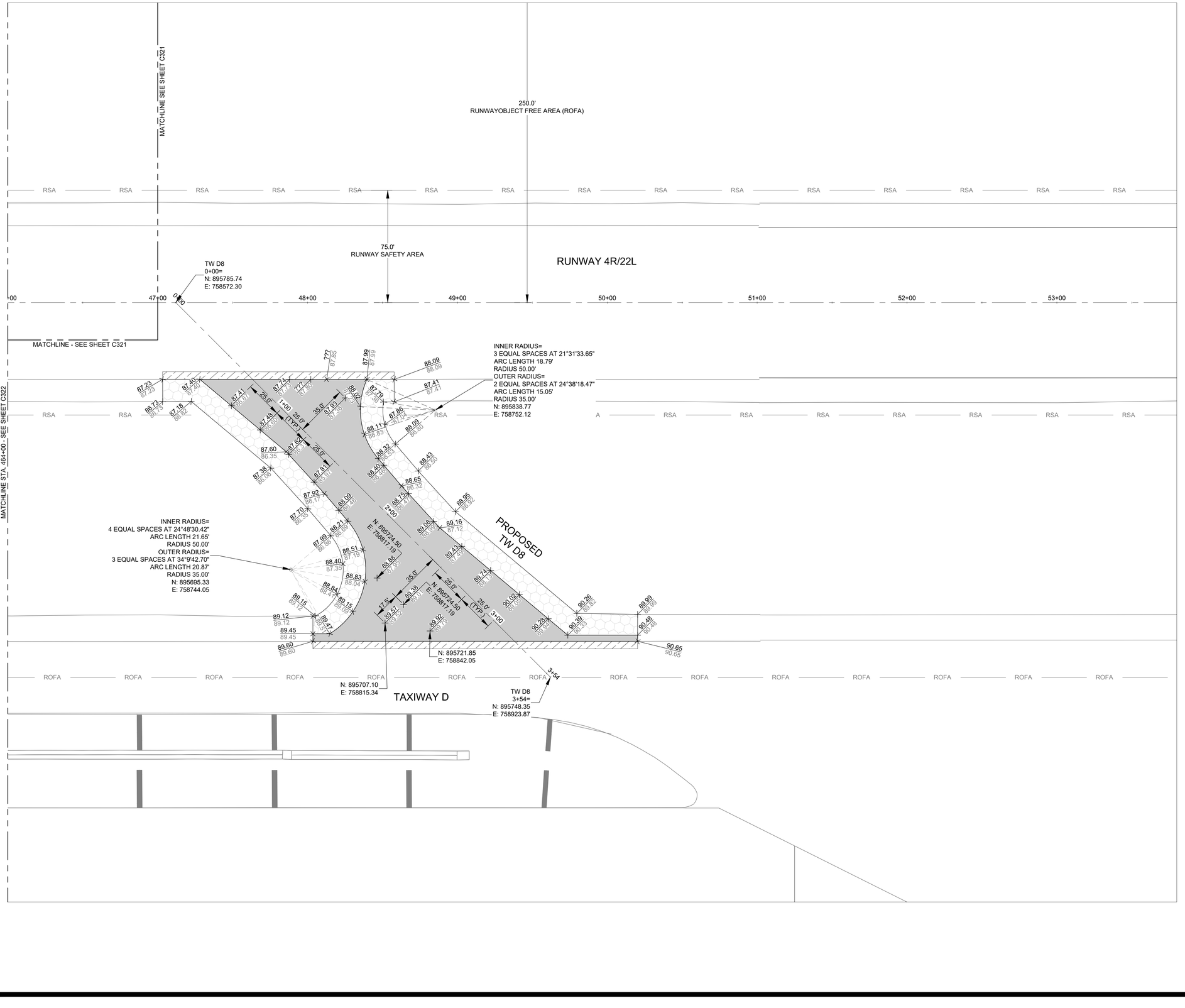
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 28 OF 52

CATALOG NUMBER: A-270547

DATE SAVED: 3/2/23
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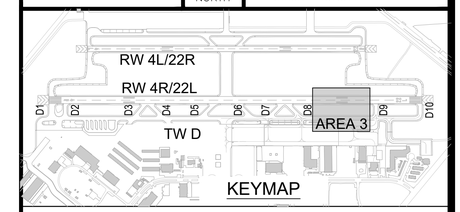


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DATE SAVED: 3/2/23

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



SPOT ELEVATION LEGEND

- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY, 4")
- FULL DEPTH ASPHALT PAVEMENT (TAXIWAY SHOULDERS, 3")
- 2" PARTIAL DEPTH ASPHALT PAVEMENT
- ×1384.40 / 1384.38 — DESIGN ELEVATION / EXISTING ELEVATION

NOTES:

1. ALL SPOT ELEVATIONS ARE AT FINISHED PAVEMENT GRADE UNLESS NOTED OTHERWISE.
2. THE CONTRACTOR SHALL REPAIR ALL AREAS DISTURBED BY THEIR OPERATIONS OUTSIDE OF THE GRADING LIMITS AT THEIR OWN EXPENSE.
3. SEE SHEET C220 - C303 FOR TYPICAL SECTIONS.
4. SEE SHEETS C301 - C303 FOR GRADING.
5. SEE SHEETS C400 AND C401. FOR TAXIWAY H, D7 AND D8 PLAN AND PROFILES.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 25' FULL SIZE
1" = 50' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 89247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

SPOT ELEVATION PLAN
AREA 3 (SCHEDULE I)

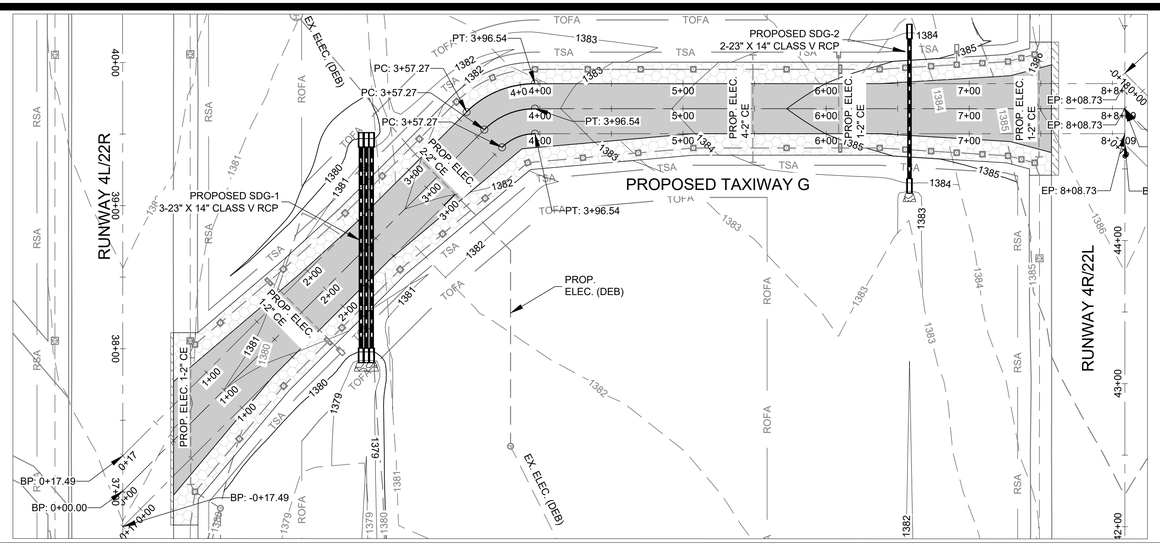
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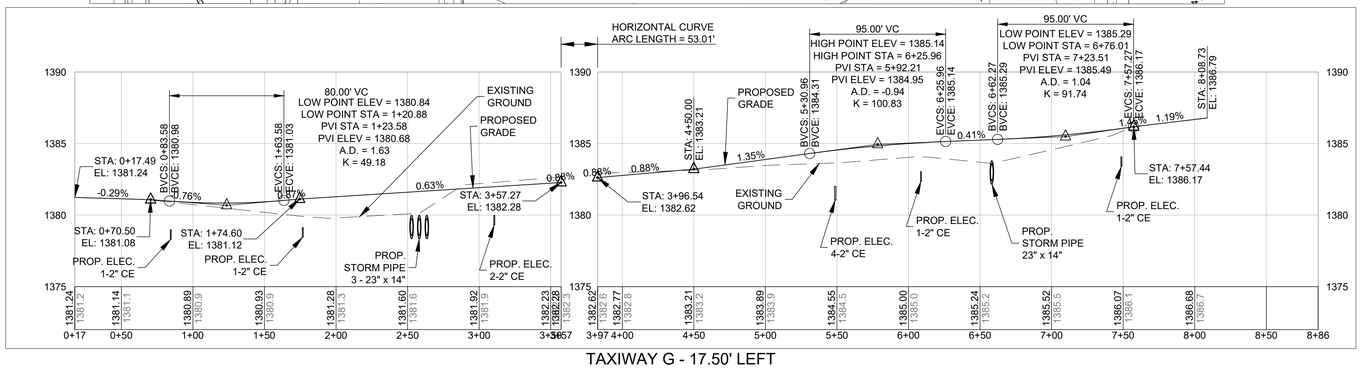
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

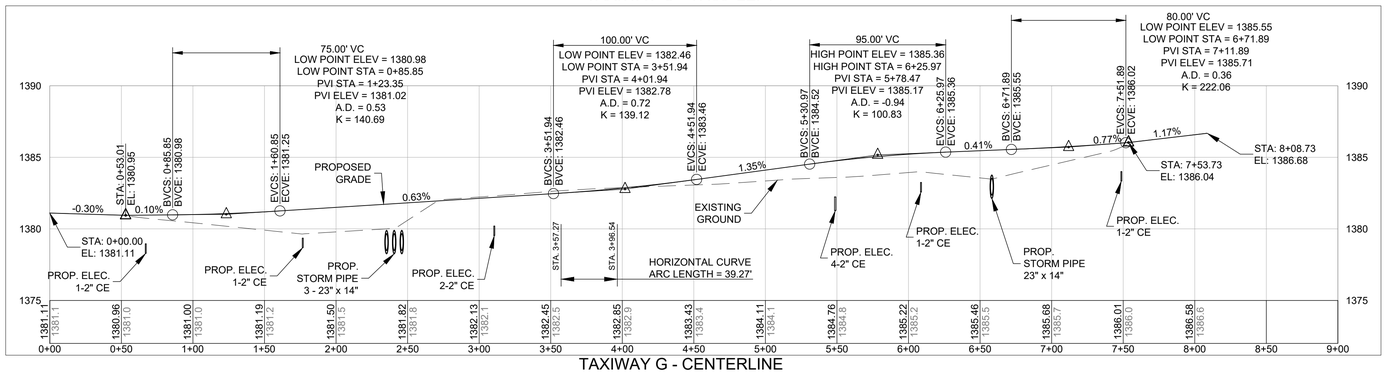
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CATALOG NUMBER: A-270548

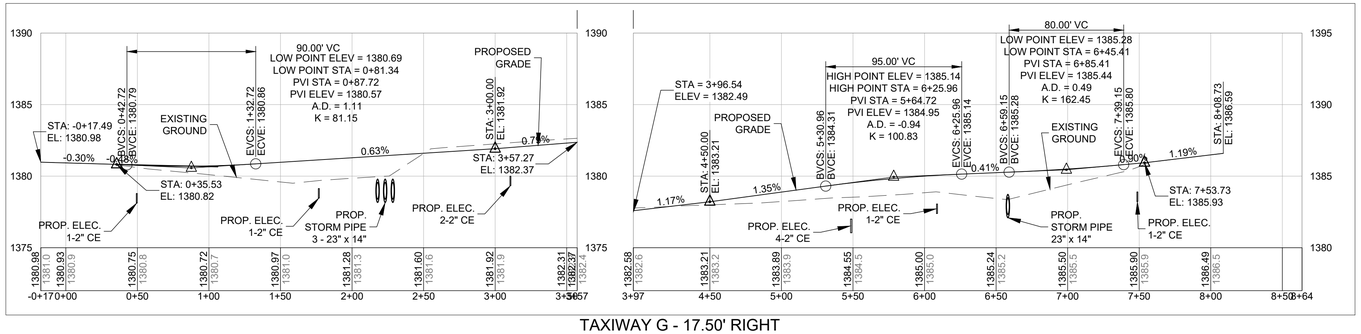




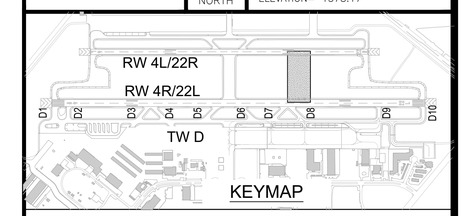
TAXIWAY G - 17.50' LEFT



TAXIWAY G - CENTERLINE



TAXIWAY G - 17.50' RIGHT



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

PROFILE LEGEND
- PROPOSED GRADE
- EXISTING GROUND
- PROFILE BAND (230.50 / 230.47)
- EXISTING ELEVATION
- PROPOSED ELEVATION

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 " = 50' FULL SIZE
1" = 100' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

TAXIWAY G
PLAN AND PROFILES

DRAWING C400

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

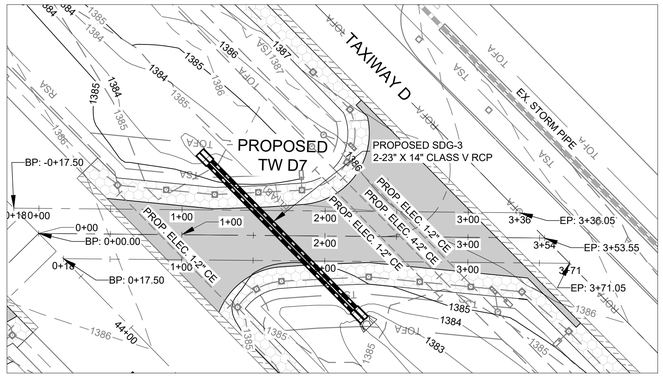
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PROJ. NO.: CP0994

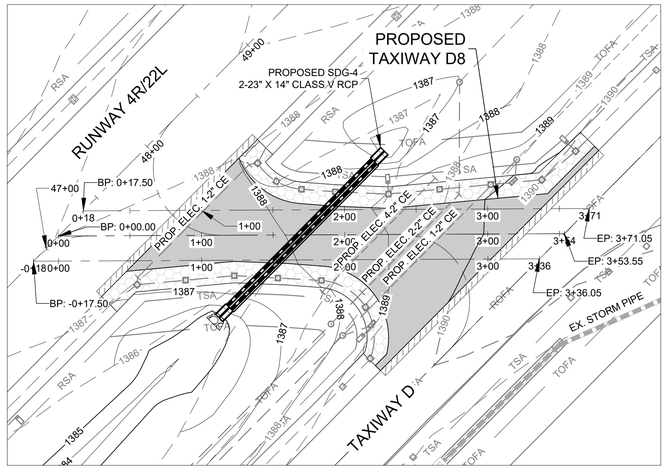
SHEET 30 OF 52

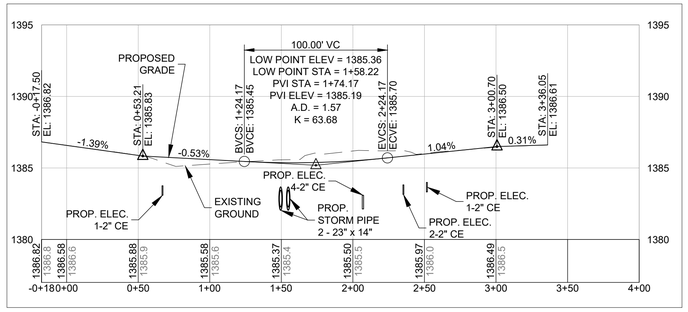
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DATE SAVED: 3/8/23

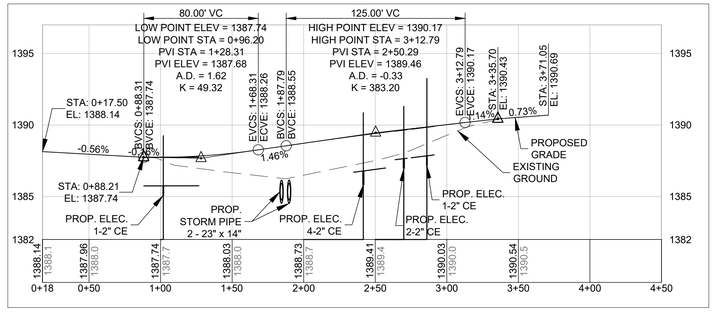
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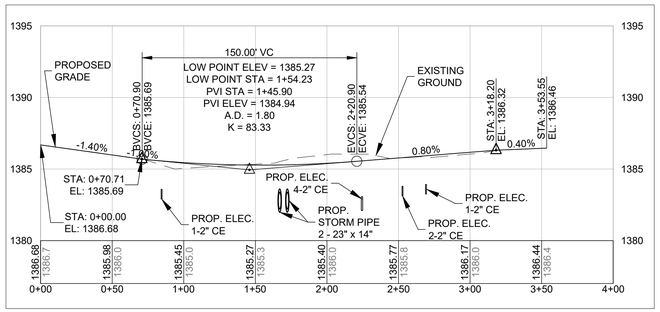




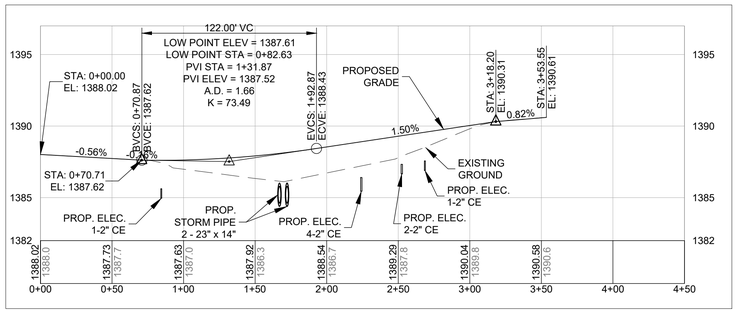
TAXIWAY D7 17.50' LEFT



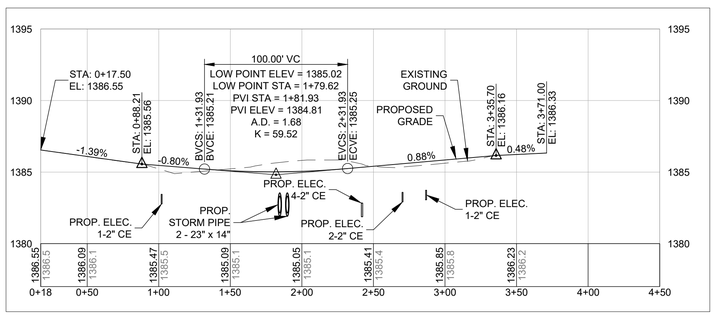
TAXIWAY D8 17.50' LEFT



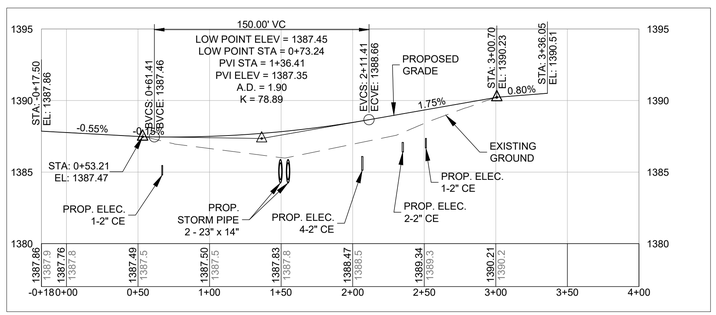
TAXIWAY D7 CENTERLINE



TAXIWAY D8 CENTERLINE



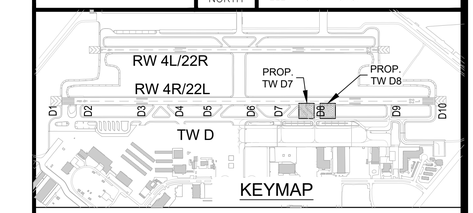
TAXIWAY D7 17.50' RIGHT



TAXIWAY D8 17.50' RIGHT

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- PROFILE BAND (230.50 / 230.47)
- EXISTING ELEVATION
- PROPOSED ELEVATION

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 " = 50' FULL SIZE
1" = 100' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

TAXIWAYS D7 AND D8
PLAN AND PROFILES

DRAWING C401

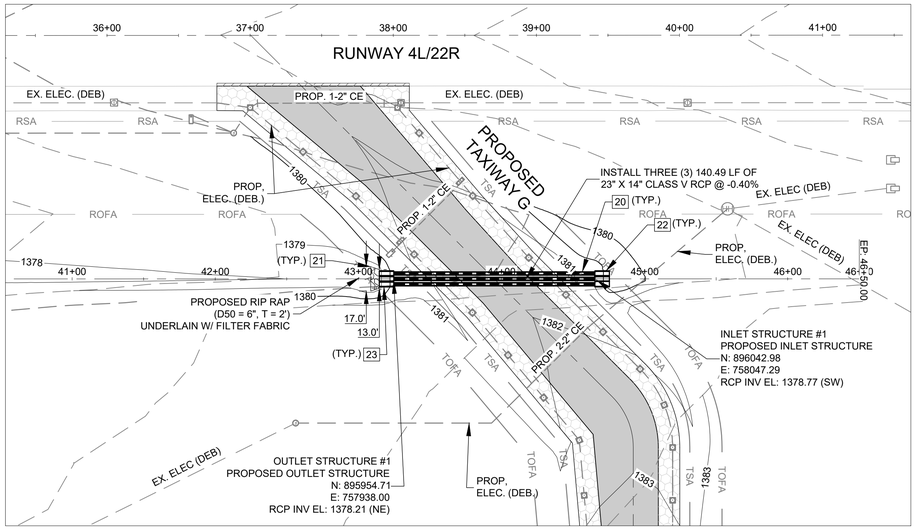
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

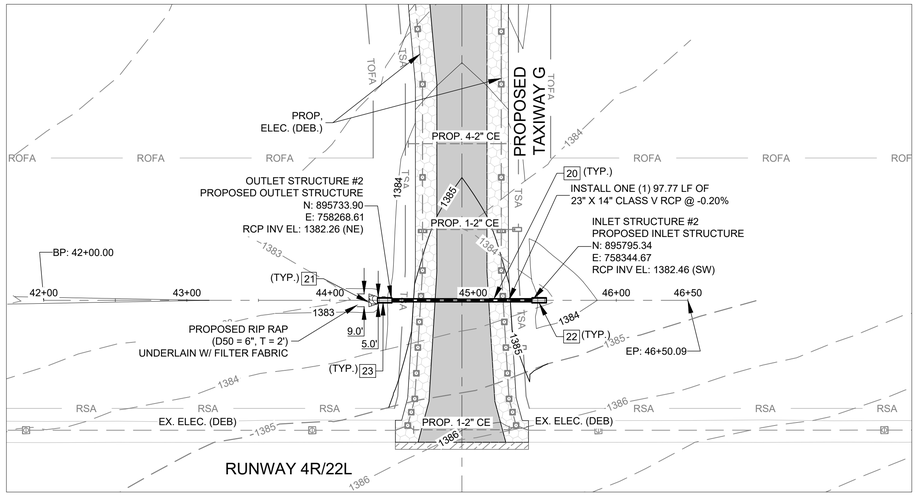
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PROJ. NO.: CP0994

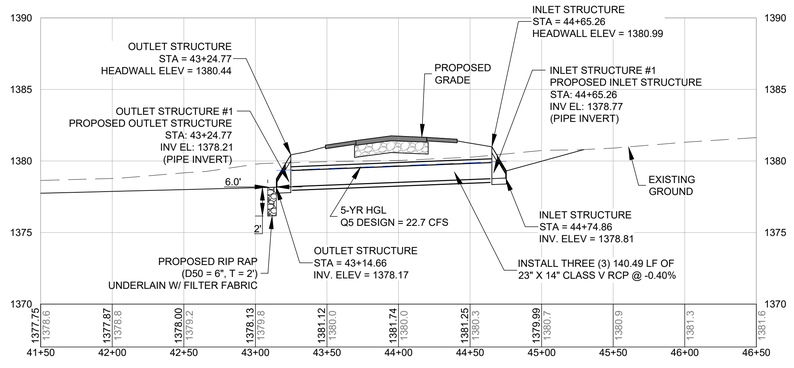
SHEET 31 OF 52

CATALOG NUMBER: A-270550

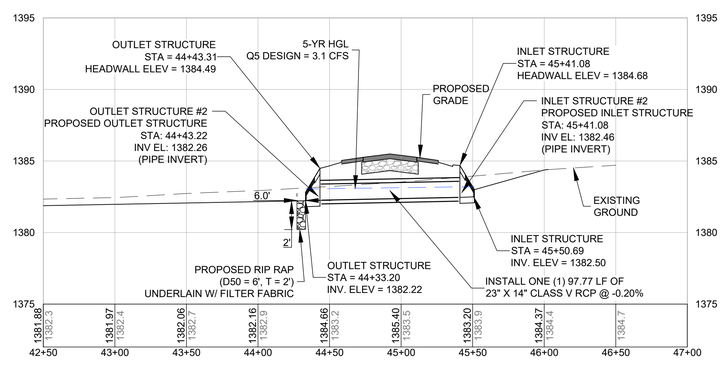
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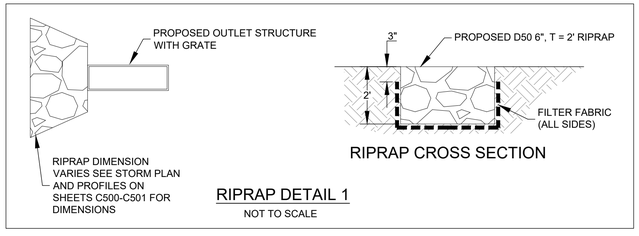




PROFILE VIEW OF SDG-1



PROFILE VIEW OF SDG-2



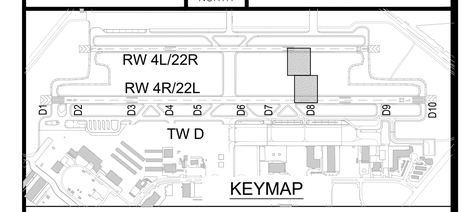
RIPRAP DETAIL 1
NOT TO SCALE

CONSTRUCTION NOTES

20	D-701a 23"x14" CLASS V RCP	520 LF.
21	D-710a RIPRAP (D50=6", T=2') UNDERLAIN W/ FILTER FABRIC	10 CY.
22	D-751a INLET STRUCTURE WITH GRADE	4 EA
23	D-751b OUTLET STRUCTURE WITH GRADE	4 EA

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



STORM LEGEND

- 1385 — EXISTING MAJOR CONTOUR
- 1386 — EXISTING MINOR CONTOUR
- 1385 — PROPOSED MAJOR CONTOUR
- 1386 — PROPOSED MINOR CONTOUR
- SWALE FLOW LINE
- STORM PIPE
- PROPOSED INLET / OUTLET STRUCTURE (SEE DETAILS ON SHEET C550)
- PROPOSED RIPRAP

PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- PROFILE BAND (230.50 / 230.47)
- EXISTING ELEVATION
- PROPOSED ELEVATION

NOTES

1. FOR INSTALLATION OF FILTER FABRIC WITH RIPRAP SEE RIPRAP DETAIL 1 ON SHEET C500

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 " = 50' FULL SIZE
1" = 100' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

STORM PIPE
PLAN AND PROFILE

DRAWING: C500

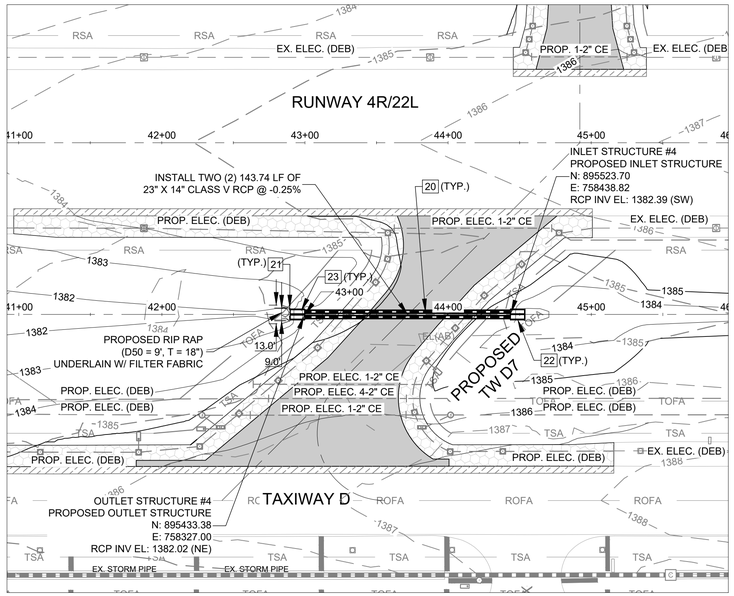
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

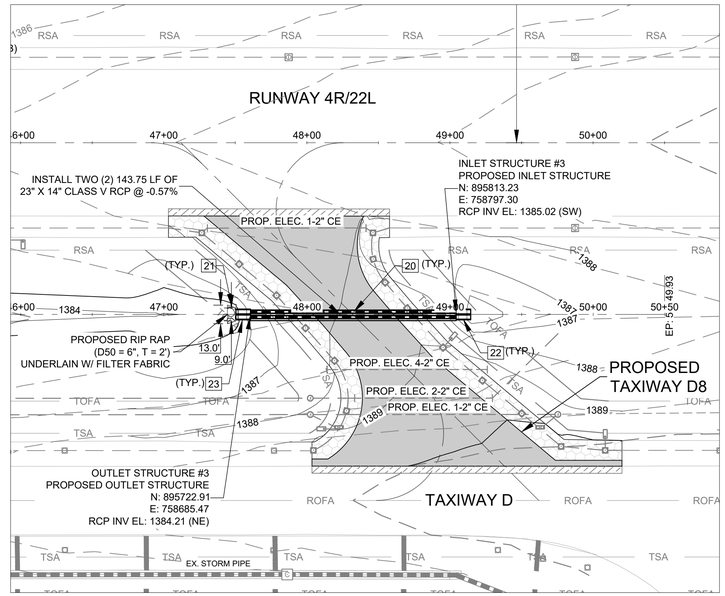
ACTIVITY:
PROJ. NO.: CP0994

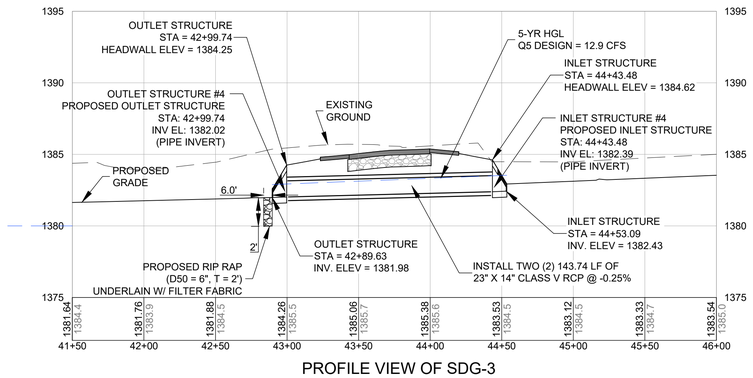
SHEET 32 OF 52

CATALOG NUMBER: A-270551

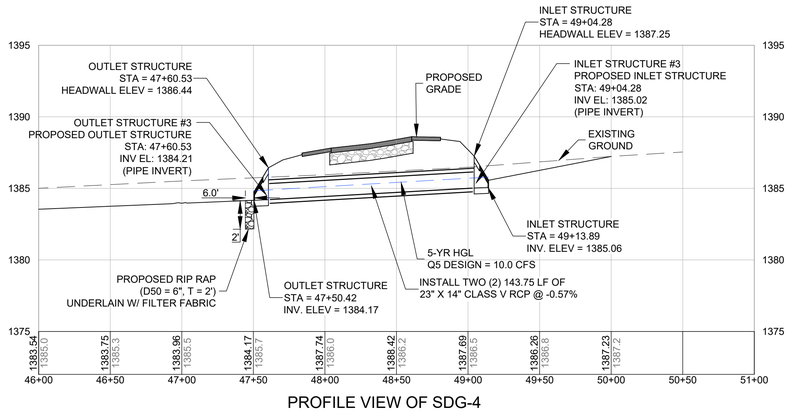
DATE SAVED: 3/8/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CADD\PLANS\050-FFZ-MCTE-C500-STRM.DWG







PROFILE VIEW OF SDG-3



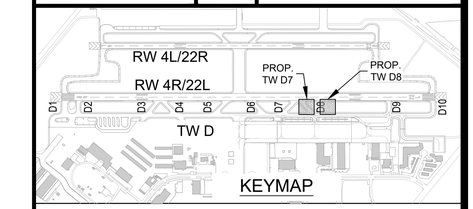
PROFILE VIEW OF SDG-4

CONSTRUCTION NOTES

20	D-701a 23"x14" CLASS V RCP	575 LF.
21	D-710a RIPRAP (D50=6", T= 2') UNDERLAIN W/ FILTER FABRIC	10 CY.
22	D-751a INLET STRUCTURE WITH GRATE	4 EA
23	D-751b OUTLET STRUCTURE WITH GRATE	4 EA

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



STORM LEGEND

- 1385 — EXISTING MAJOR CONTOUR
- 1386 — EXISTING MINOR CONTOUR
- 1385 — PROPOSED MAJOR CONTOUR
- 1386 — PROPOSED MINOR CONTOUR
- SWALE FLOW LINE
- STORM PIPE
- PROPOSED INLET / OUTLET STRUCTURE (SEE DETAILS ON SHEET C550)
- PROPOSED RIPRAP

PROFILE LEGEND

- PROPOSED GRADE
- EXISTING GROUND
- 230.50 / 230.47 — PROFILE BAND
- EXISTING ELEVATION
- PROPOSED ELEVATION

NOTES

1. FOR INSTALLATION OF FILTER FABRIC WITH RIPRAP SEE RIPRAP DETAIL 1 ON SHEET C500

GRAPHIC SCALE
50 0 50 100
(IN FEET)
1 " = 50' FULL SIZE
1" = 100' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

STORM PIPE
PLAN AND PROFILE

DRAWING C501

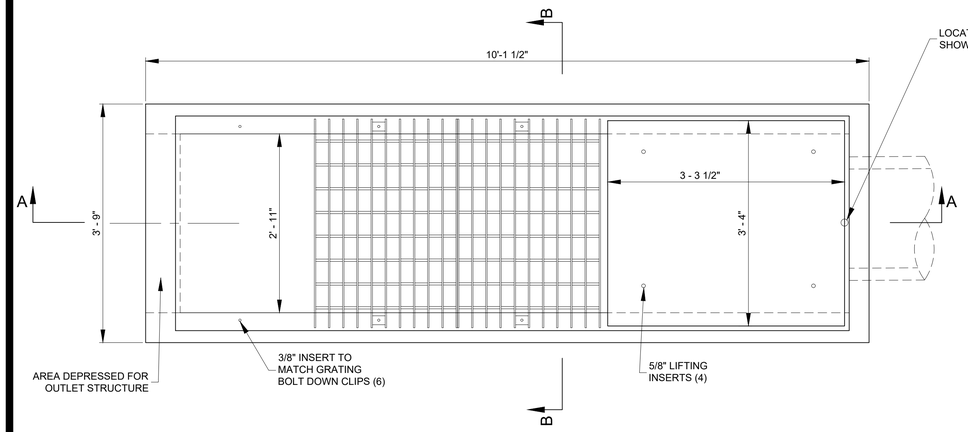
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: ____
PROJ. NO.: CP0994

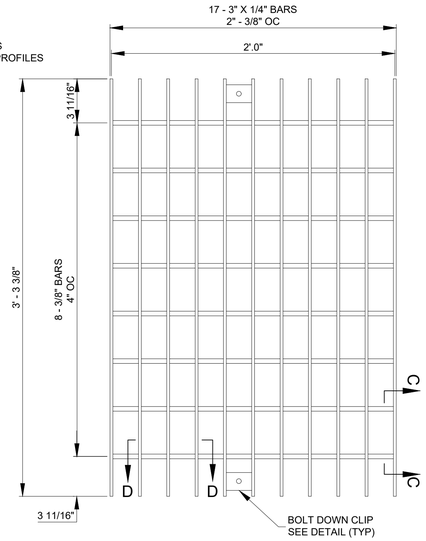
SHEET 33 OF 52

CATALOG NUMBER: A-270552

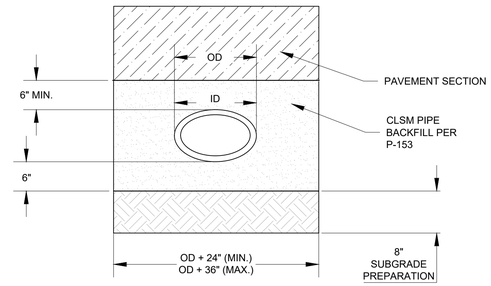
DATE SAVED: 3/8/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CADD\PLANS\050-FFZ-MCTE-C500-STRM.DWG



PLAN

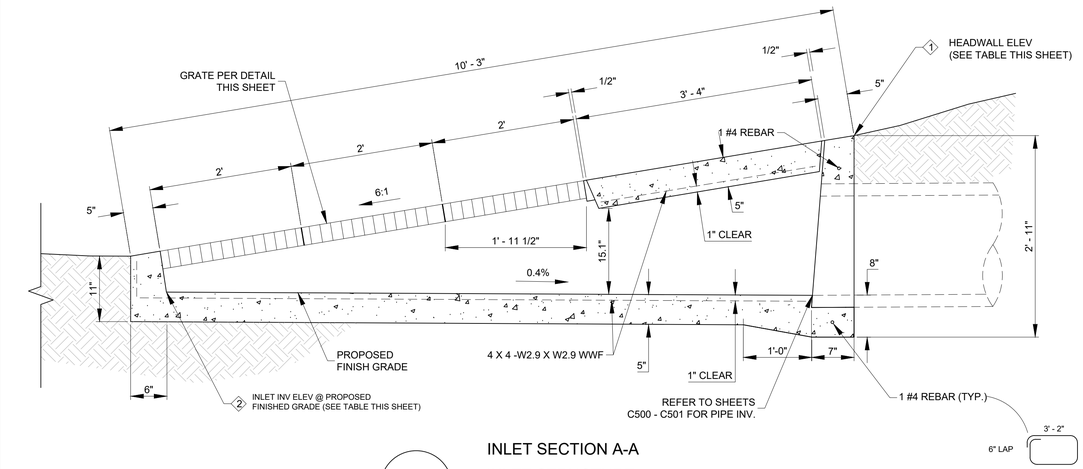


GRATE PLAN



TYPICAL PIPE TRENCH-CLSM BEDDING

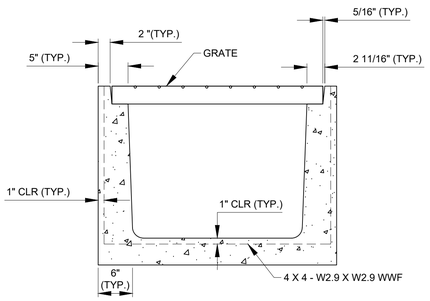
N.T.S.



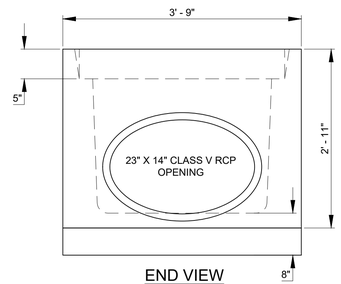
1 INLET SECTION A-A

INLET STRUCTURE

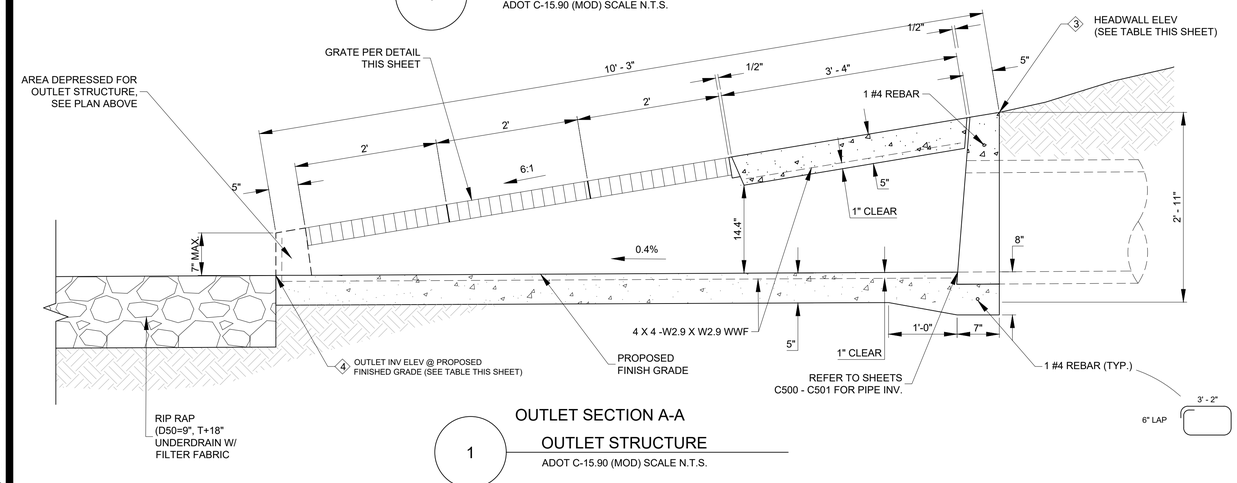
ADOT C-15.90 (MOD) SCALE N.T.S.



SECTION B-B



END VIEW



1 OUTLET SECTION A-A

OUTLET STRUCTURE

ADOT C-15.90 (MOD) SCALE N.T.S.

INLET/OUTLET STORM DRAIN PIPE AND HEADWALL ELEVATIONS

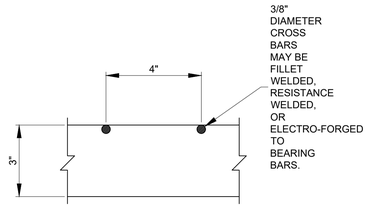
PIPE DESCRIPTION	INLET HEADWALL ELEV. ①	INLET INV. ELEV. ②	OUTLET HEADWALL ELEV. ③	OUTLET INV. ELEV. ④
TAXIWAY H SDG-1, (3 PIPES)	1380.99	1378.81	1380.44	1378.17
TAXIWAY H SDG-2, (1 PIPES)	1384.68	1382.50	1384.49	1382.22
TAXIWAY D7 SDG-3, (2 PIPES)	1384.62	1382.43	1384.25	1381.98
TAXIWAY D8 SDG-4, (2 PIPES)	1387.25	1385.06	1386.44	1384.17

NORTH

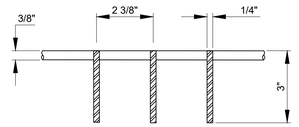
BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

GENERAL NOTES:

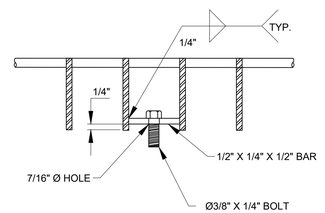
1. CONCRETE SHALL CONFORM TO THE REQUIREMENTS FOR P-610 CONCRETE. THE MINIMUM STRENGTH SHALL BE 4000 PSI.
2. GROUT SHALL BE IN ACCORDANCE WITH MAG SPEC 776' WITH THE EXCEPTION THAT THE WATER CONTENT SHALL BE SUCH THAT THE CONSISTENCY IS PROPER FOR SMOOTH TROWELING, CONSISTENCY SHALL BE VERIFIED BY THE OWNER PRIOR TO APPLICATION.
3. ALL WELDING SHALL BE IN ACCORDANCE WITH ADOT STANDARD SPECIFICATION 604-3.06.
4. THE COMPLETED GRATE SHALL BE GIVEN ONE SHOP COAT OF NO. 1 PAINT.
5. FOUNDATION SOIL AND BACKFILL SHALL BE IN ACCORDANCE WITH SECTION P-152 OF THE TECHNICAL SPECIFICATIONS.



SECTION C-C



SECTION D-D



BOLT DOWN CLIP DETAIL

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE
69247
JON BRYCE
WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

STORM DETAILS

DRAWING C550

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

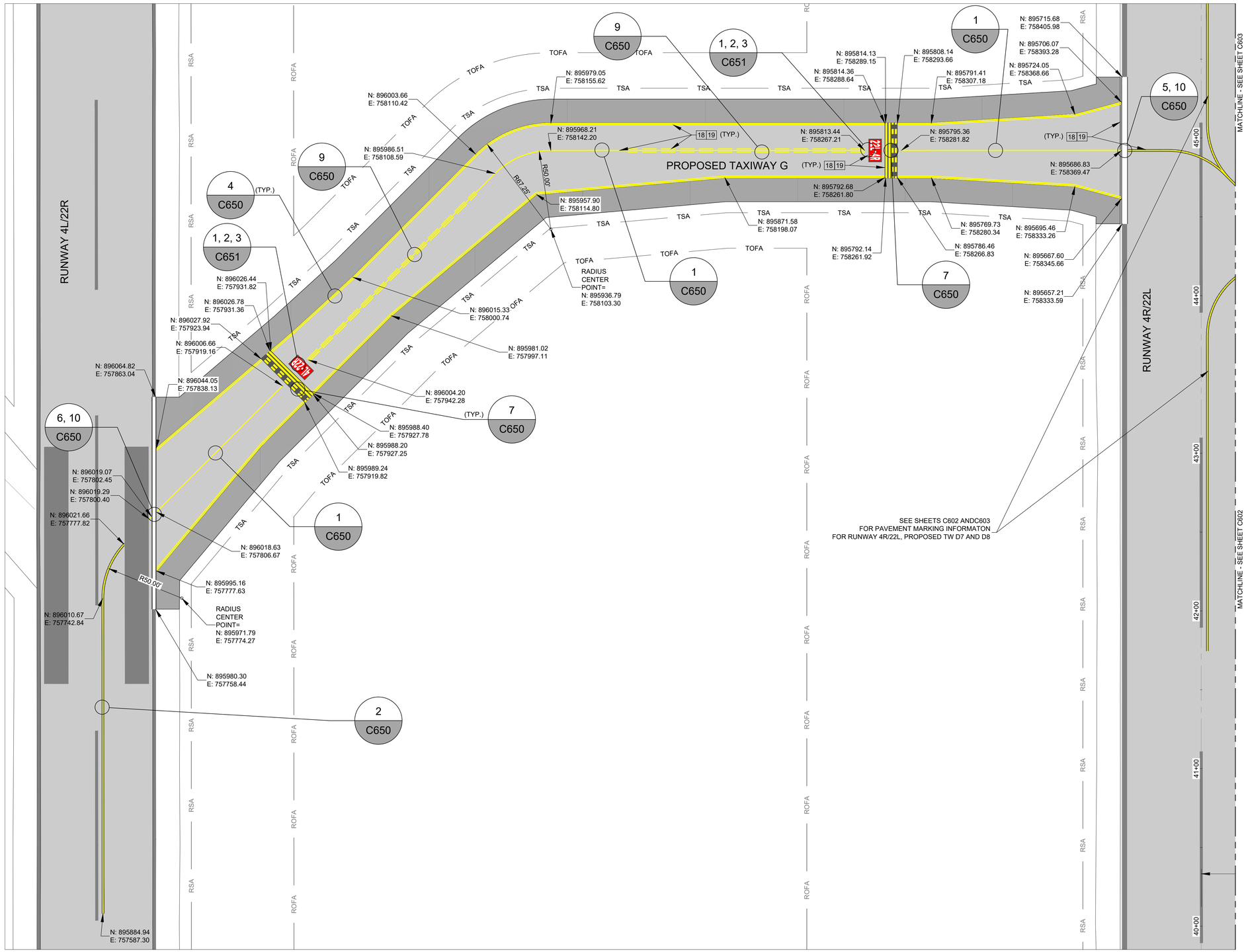
ACTIVITY:
PROJ. NO.: CP0994

SHEET 34 OF 52

CATALOG NUMBER: A-270553

DATE SAVED: 3/2/23

L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\055-FFZ-MCTE-C550-STRM-DETL.DWG

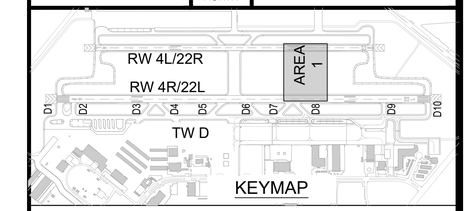


PAVEMENT MARKING ITEMS

18	P-620b MARKING (TEMPORARY)	4,520 SF.
19	P-620c MARKING (PERMANENT)	4,520 SF.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



PAVEMENT MARKING LEGEND

- EXISTING PAINT
- PROPOSED WHITE PAINT
- PROPOSED YELLOW PAINT
- PROPOSED GREEN PAINT
- PROPOSED BLACK PAINT

NOTES:

1. SEE PAINT DETAIL SHEET C650 FOR PAINT DETAILS AND GENERAL PAINT AND OBLITERATION NOTES.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer Certificate No. 69247 JON BRYCE WEEKS Date Signed 3/06/23 ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

PAVEMENT MARKING PLAN AREA 1 (SCHEDULE II)

DRAWING C601

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

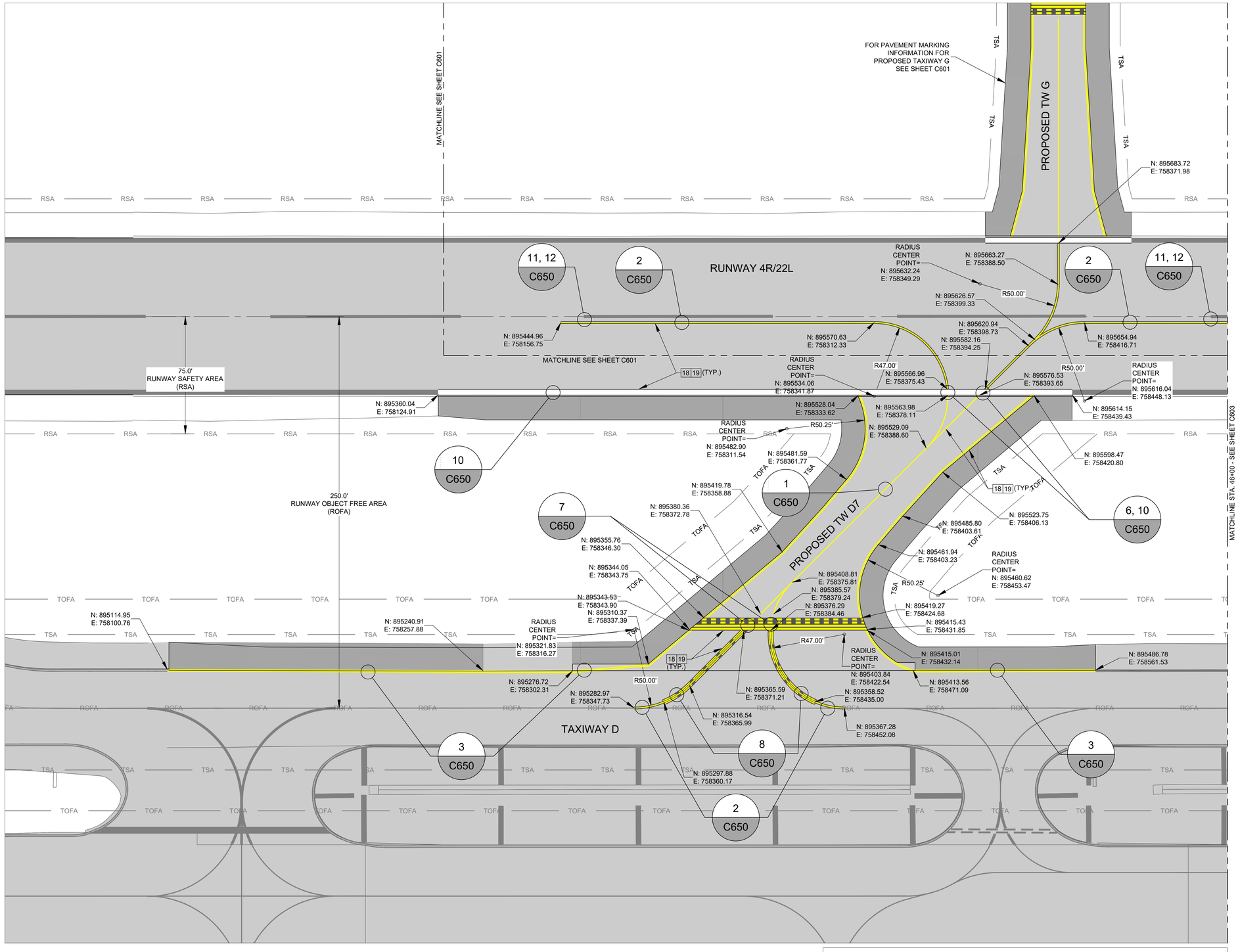
ACTIVITY: _____
PROJ. NO.: CP0994

SHEET 35 OF 52

CATALOG NUMBER: A-270554

DATE SAVED: 3/3/23

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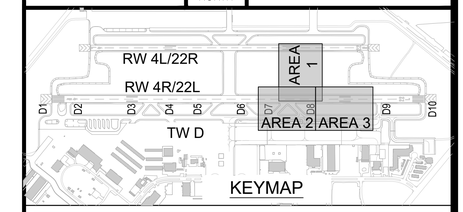


PAVEMENT MARKING ITEMS

18	P-620b MARKING (TEMPORARY)	5,392 SF.
19	P-620c MARKING (PERMANENT)	5,392 SF.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



PAVEMENT MARKING LEGEND

- EXISTING PAINT
- PROPOSED WHITE PAINT
- PROPOSED YELLOW PAINT
- PROPOSED GREEN PAINT
- PROPOSED BLACK PAINT

NOTES:

1. SEE PAINT DETAIL SHEET C650 FOR PAINT DETAILS AND GENERAL PAINT AND OBLITERATION NOTES.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69241 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

PAVEMENT MARKING PLAN AREA 2 (SCHEDULE I)

DRAWING C602

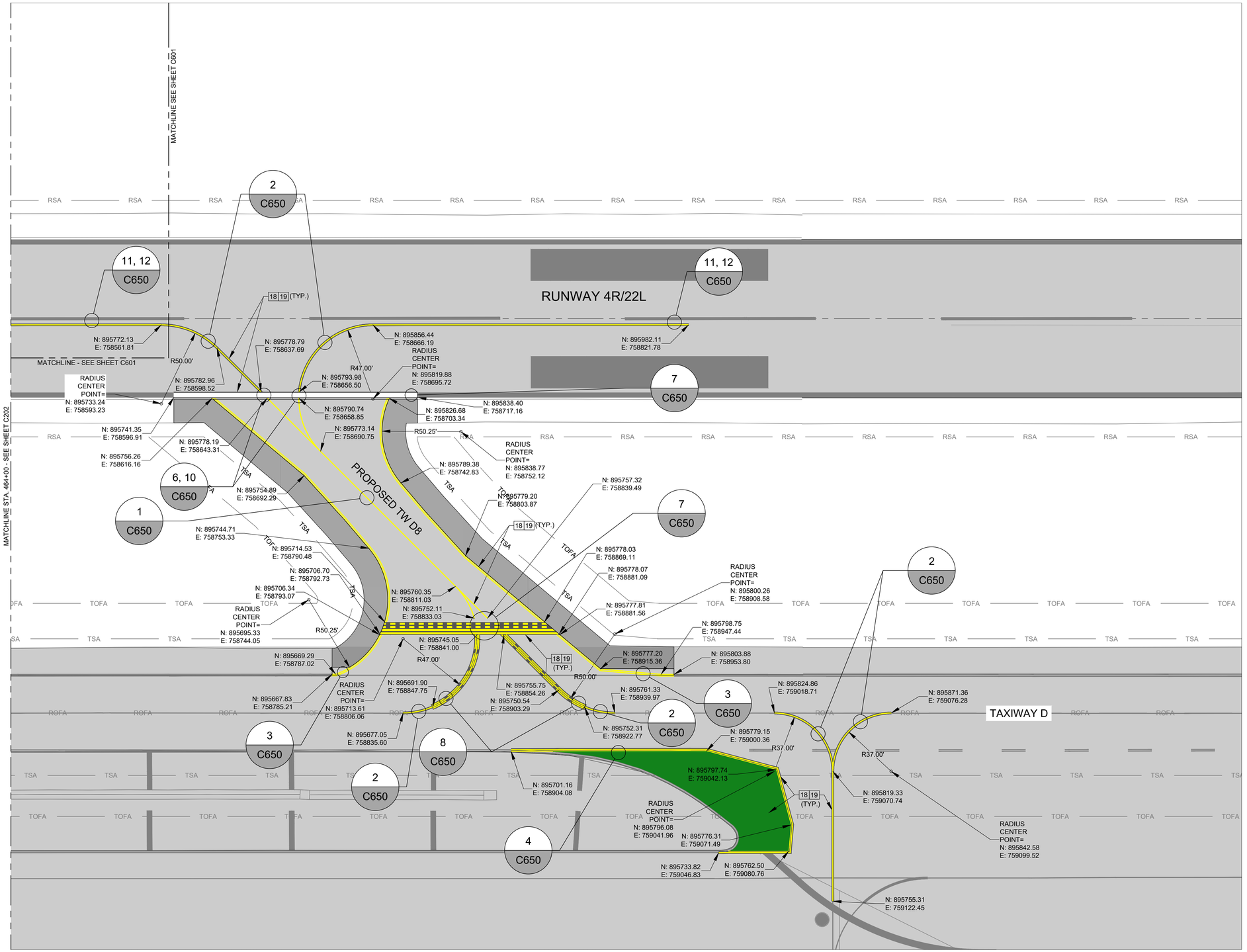
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: ____
PROJ. NO.: CP0994

SHEET 36 OF 52

CATALOG NUMBER: A-270555

DATE SAVED: 3/3/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\060-FFZ-MCTE-C602-PANT.DWG

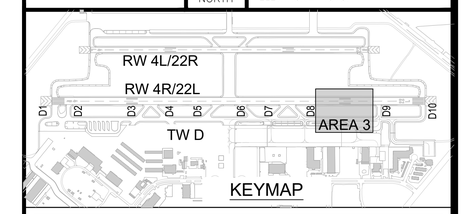


PAVEMENT MARKING ITEMS

18	P-620b MARKING (TEMPORARY)	8,393 SF.
19	P-620c MARKING (PERMANENT)	8,393 SF.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



KEYMAP

PAVEMENT MARKING LEGEND

- EXISTING PAINT
- PROPOSED WHITE PAINT
- PROPOSED YELLOW PAINT
- PROPOSED GREEN PAINT
- PROPOSED BLACK PAINT

NOTES:

1. SEE PAINT DETAIL SHEET C650 FOR PAINT DETAILS AND GENERAL PAINT AND OBLITERATION NOTES.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 59247 JON BRYCE WEEKS Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

PAVEMENT MARKING PLAN
AREA 3 (SCHEDULE I)

DRAWING C603

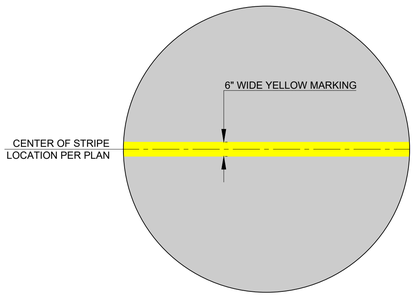
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 37 OF 52

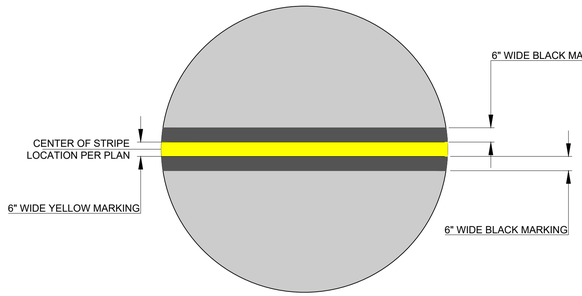
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DATE SAVED: 3/3/23
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1 TAXIWAY CENTERLINE DETAIL

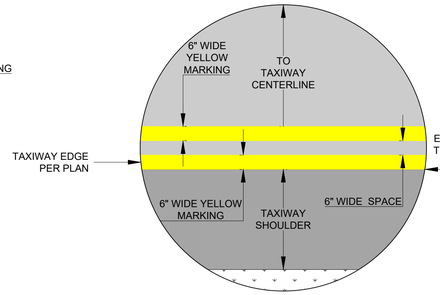
NOT TO SCALE



2 TAXIWAY CENTERLINE DETAIL WITH BLACK PAINT

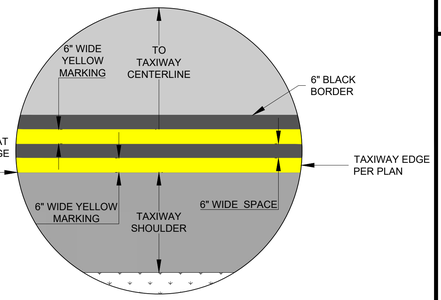
NOT TO SCALE

NOTE:
1. CENTERLINE MARKING SEE NOTE 2.



3 TAXIWAY SOLID EDGE LINE DETAIL

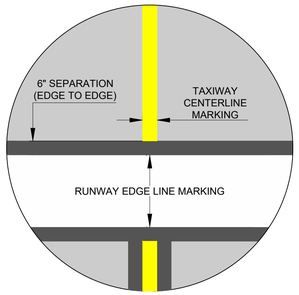
NOT TO SCALE



4 TAXIWAY SOLID EDGE LINE DETAIL WITH BLACK PAINT

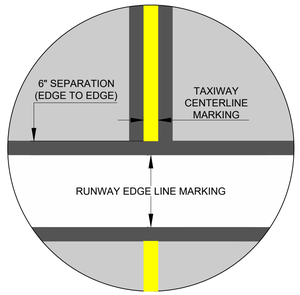
NOT TO SCALE

NOTE:
1. SOLID EDGE LINE MARKING SEE NOTE 2.



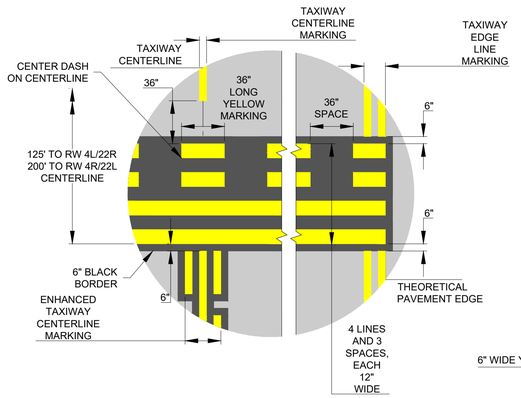
5 TAXIWAY CENTERLINE INTERSECTING RUNWAY EDGE LINE DETAIL

NOT TO SCALE



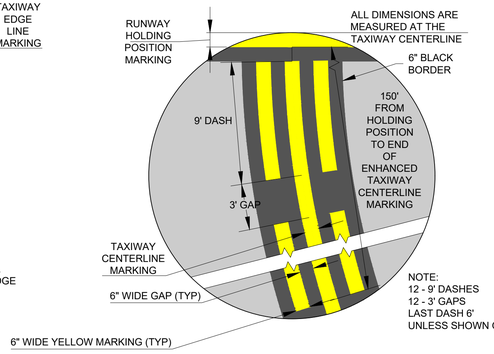
6 TAXIWAY CENTERLINE INTERSECTING RUNWAY EDGE LINE DETAIL WITH BLACK PAINT

NOT TO SCALE



7 RUNWAY HOLDING POSITION DETAIL

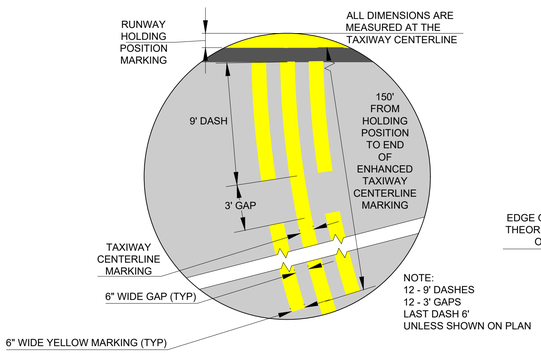
NOT TO SCALE



8 ENHANCED TAXIWAY CENTERLINE DETAIL WITH BLACK PAINT

NOT TO SCALE

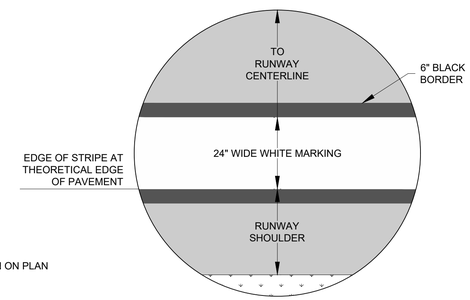
NOTE:
1. ENHANCED TAXIWAY CENTERLINE MARKING SEE NOTE 2.



9 ENHANCED TAXIWAY CENTERLINE DETAIL

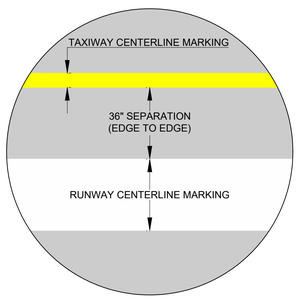
NOT TO SCALE

NOTE:
1. THIS DETAIL IS CURRENTLY NOT USED IN THE BID DOCUMENTS, BUT HAS BEEN LEFT IN THE PLAN SET ENCASE NEEDED DURING CONSTRUCTION.



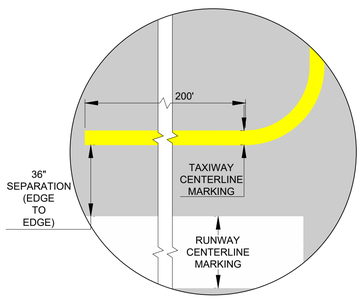
10 RUNWAY EDGE LINE DETAIL

NOT TO SCALE



11 PARALLEL RUNWAY & TAXIWAY CENTERLINE SEPARATION DETAIL

NOT TO SCALE



12 TAXIWAY LEAD IN LINE DETAIL

NOT TO SCALE

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

GENERAL MARKING NOTES

1. UNLESS OTHERWISE SPECIFIED, ALL TAXIWAY MARKINGS SHALL BE YELLOW AND ALL RUNWAY MARKINGS SHALL BE WHITE IN ACCORD WITH SPECIFICATION P-620.
2. ALL STRIPING WILL HAVE A BLACK BORDER AT THE DIMENSIONS INDICATED ON THE DETAILS UNLESS STRIPING IS BEING APPLIED TO NEW ASPHALT PAVEMENT.
3. CONTRACTOR WILL BE REQUIRED TO REPAINT ANY MARKINGS THAT ARE OUTSIDE THE PROJECT WORK LIMITS WHICH ARE DAMAGED BY THE CONTRACTORS OPERATIONS. REPAINTING OF THESE DAMAGED AREAS WILL BE AT THE CONTRACTORS EXPENSE.
4. PERMANENT APPLICATION OF PAINT WILL BE APPLIED 30 DAYS AFTER THE INITIAL TEMPORARY APPLICATION. RATES OF APPLICATION SHALL BE AS SPECIFIED IN SECTION P-620.
5. ALL PERMANENT MARKINGS SHALL BE APPLIED DURING DAYLIGHT HOURS ONLY.
6. GLASS BEADS SHALL BE APPLIED TO ALL TEMPORARY AND PERMANENT PAVEMENT MARKINGS. APPLICATION RATES AND GLASS BEAD TYPE SHALL BE AS SPECIFIED IN ITEM P-620. GLASS BEADS SHALL NOT BE APPLIED TO BLACK PAINT.
10. UNLESS OTHERWISE SPECIFIED, ALL TAXIWAY MARKINGS ARE 6" WIDE (YELLOW).
11. FINAL PAINT LAYOUT WILL BE CONFIRMED BY THE AIRPORT PRIOR TO CONSTRUCTION.
12. ALL AREAS SHALL BE THOROUGHLY CLEANED PRIOR TO PLACING PAINT MARKINGS.
13. CONTRACTOR SHALL HAVE A COPY OF THE CURRENT FAA ADVISORY CIRCULAR AC 150/5340-1M "STANDARDS FOR AIRPORT MARKINGS" ON SITE AT ALL TIMES. ANY DISCREPANCY BETWEEN INFORMATION SHOWN ON THE PLAN SHEETS AND THE ADVISORY CIRCULAR SHALL BE COORDINATED WITH THE ENGINEER FOR DIRECTION.
14. ANY DISCREPANCIES BETWEEN THESE PLANS AND THE ACTUAL STRIPING PRESENT IN THE FIELD SHALL BE BROUGHT TO THE ATTENTION OF RPR.

OBLITERATION NOTES

1. PAINT OBLITERATION SHALL BE ACCOMPLISHED BY WATER OR SAND BLASTING OR ANOTHER APPROVED METHOD. TEMPORARY MARKING REMOVAL REQUIRED FOR COORDINATION OF PHASES MAY BE ACCOMPLISHED BY PAINTING OVER THE EXISTING MARKING WITH BLACK PAINT.
2. NO OBLITERATION OF MARKINGS ARE REQUIRED INSIDE PAVEMENT REMOVAL LIMITS.
3. ANY DAMAGE DONE DURING MARKING OBLITERATION OPERATIONS TO PAVEMENTS OR PAVEMENT JOINT/CRACK SEALS SHALL BE REPAIRED BY THE CONTRACTOR, AT HIS EXPENSE, AND TO THE APPROVAL OF THE ENGINEER.

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

PAVEMENT MARKING DETAILS

DRAWING C650

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: PROJ. NO.: CP0994

SHEET 38 OF 52

CATALOG NUMBER: A-270557

DATE SAVED: 3/2/23

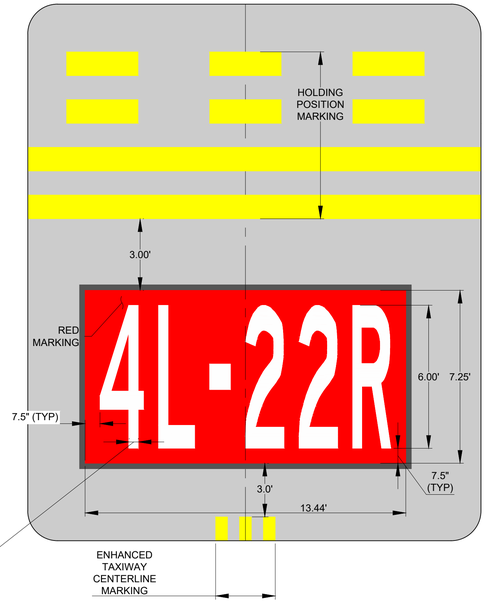
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\065-FFZ-MCTE-C650-PANT-DETL.DWG

HOLDING POSITION NOTES

1. THE CONTRACTOR SHALL PROVIDE STENCILS WHICH WILL REMAIN WITH THE AIRPORT AFTER THE PROJECT COMPLETION. THE CONTRACTOR MUST SUBMIT A TEMPLATE OF THE STENCILS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL MAINTAIN THE STENCILS THROUGHOUT USE AND WILL BE RESPONSIBLE FOR REPLACEMENT IF ANY DAMAGE OCCURS.

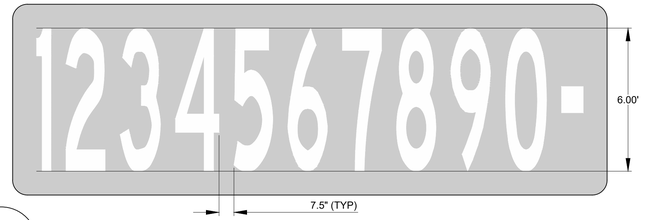
1. DIMENSIONS MAY VARY BASED ON THE SIZES OF STENCILS USED. LARGER WIDTH SIGNS MAY BE NEEDED DEPENDING ON STENCIL WIDTH IN ORDER TO MEET THE INDICATED SPACING REQUIREMENT. COST ADJUSTMENTS WILL NOT BE PERMITTED IF LARGER SIGNS ARE NEEDED DUE TO TO STENCIL WIDTH.

2. TWO PAINT APPLICATIONS WILL BE REQUIRED FOR EACH RUNWAY HOLD POSITION MARKING. THE FIRST APPLICATION SHALL USE THE TEMPORARY PAINT APPLICATION RATE. THE SECOND APPLICATION SHALL USE THE PERMANENT PAINT APPLICATION RATE.



1 HOLDING POSITION DETAIL (TAXIWAYS LESS THAN OR EQUAL 35' WIDE)

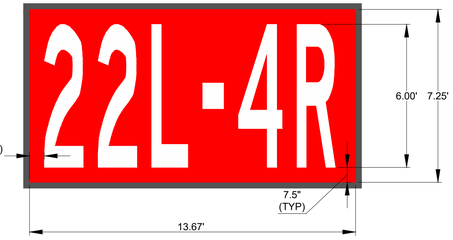
DETAIL SCALE: 1" = 3'



2 HOLDING POSITION NUMBERS (TAXIWAYS LESS THAN OR EQUAL 35' WIDE)

DETAIL SCALE: 1" = 3'





3 HOLDING POSITION DETAIL (TAXIWAYS LESS THAN OR EQUAL 35' WIDE)

DETAIL SCALE: 1" = 3'

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

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1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 59247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

PAVEMENT MARKING DETAILS

DRAWING C651

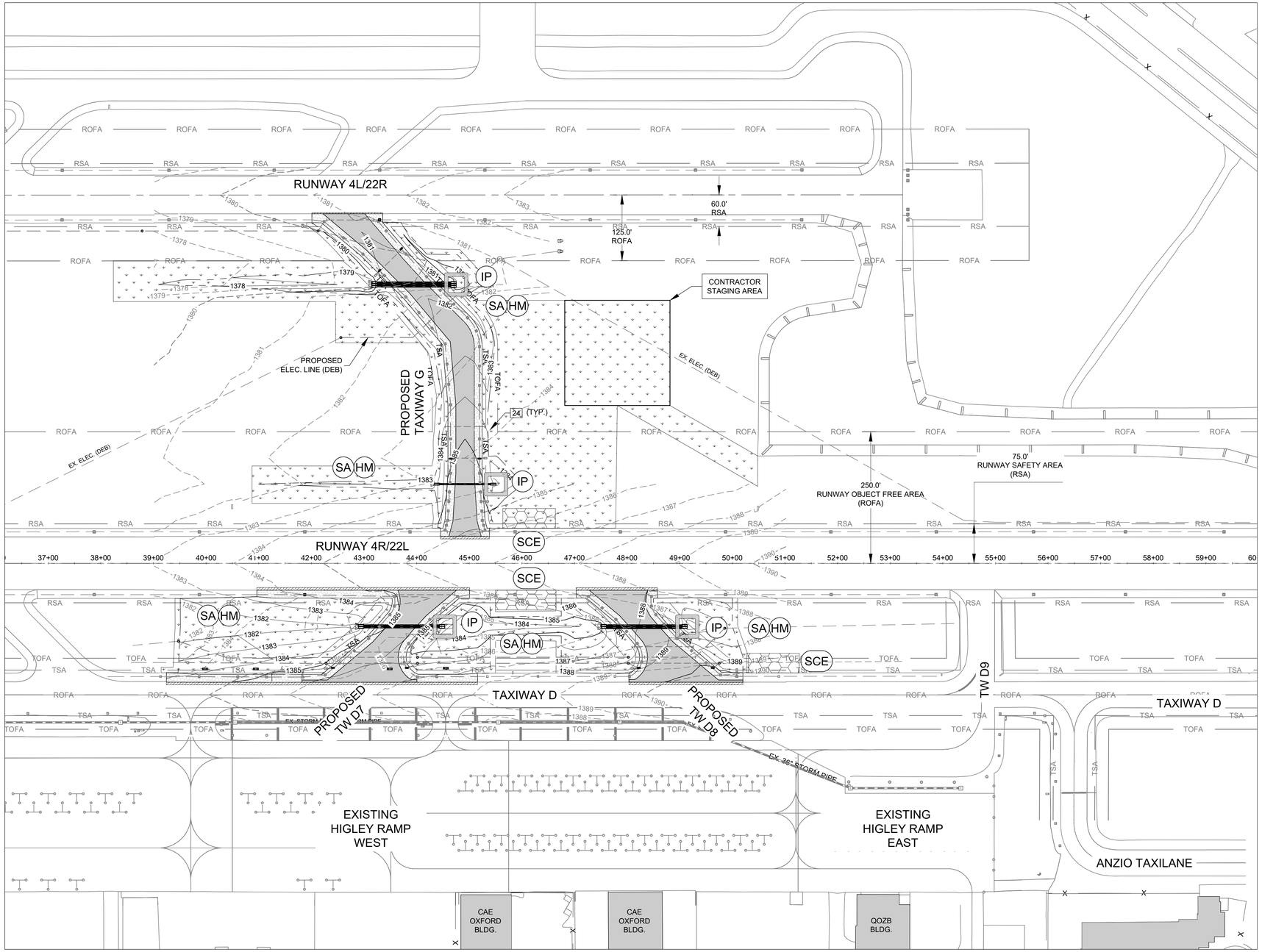
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: ____
PROJ. NO.: CP0994

SHEET 39 OF 52

CATALOG NUMBER: A-270558

DATE SAVED: 3/2/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\065-FFZ-MCTE-C650-PANT-DETL.DWG

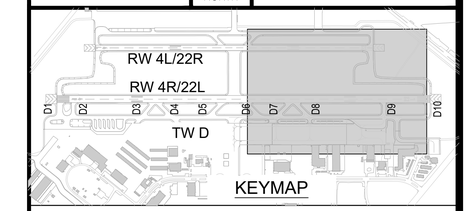


CONSTRUCTION NOTES

24	T-901a SEEDING WITH (HYDROMULCH)	9 AC

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



KEYMAP

EROSION CONTROL LEGEND

- 1385 — EXISTING INDEX CONTOUR
- 1386 — EXISTING INTERMEDIATE CONTOUR
- 1385 — PROPOSED INDEX CONTOUR
- 1386 — PROPOSED INTERMEDIATE CONTOUR
- PROJECT GRADING LIMITS
- SA HM — SEEDING WITH HYDROMULCH
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- IP — INLET PROTECTION

NOTES:

1. FOR EROSION CONTROL NOTES, SEE SHEET G003.
2. FOR EROSION CONTROL DETAILS SEE SHEET C750.

GRAPHIC SCALE
100 0 100 200
(IN FEET)
1 " = 100' FULL SIZE
1" = 200' HALF SIZE

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1	J.B.W.	03/03/23	ISSUED FOR BID

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CERTIFICATE NO.
69247
JON BRYCE WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

EROSION CONTROL PLAN

DRAWING C701

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 40 OF 52

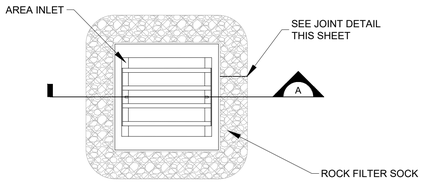
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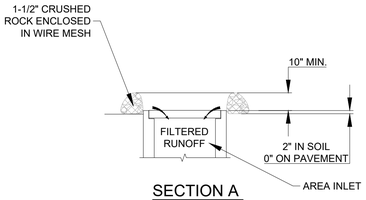
IP

INLET PROTECTION (BMPS-SPC-1)

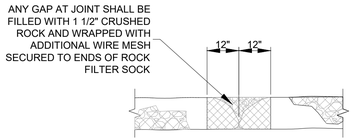
INLET PROTECTION CONTINUED



AREA INLET - PLAN



SECTION A



ROCK FILTER JOINT DETAIL

INLET PROTECTION INSTALLATION NOTES

1. CRUSHED SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL HAVE GRADATION OF 1-1/2" MINUS.
2. WIRE MESH SHALL BE FABRICATED OF 10 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
3. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
4. ROCK ILTER SOCK SHALL BE CONSTRUCTED IN ONE PIECE OR SHALL BE CONSTRUCTED USING JOINT DETAIL.

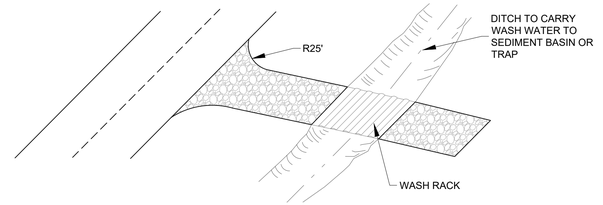
INLET PROTECTION MAINTENANCE NOTES

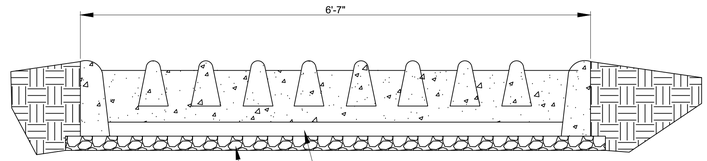
1. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED AT THE END OF EACH DAY DURING CONSTRUCTION OR WHEN THE SEDIMENT DEPTH UPSTREAM OF ROCK BERM IS WITHIN 2-1/2 INCHES OF THE CREST.
2. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE LOCAL JURISDICTION APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.
3. WHEN INLET PROTECTION AT AREA INLETS IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOP SOIL, DRILL SEEDED AND CRIMP MULCHED, OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

1 INLET PROTECTION
NOT TO SCALE

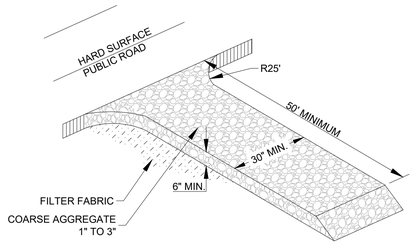
SCE

STABILIZED CONSTRUCTION ENTRANCE (BMP-EC-5)





WASH RACK



2 STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

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Registered Professional Engineer (Civil) CERTIFICATE 69247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

EROSION CONTROL DETAILS

DRAWING C750

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: --
PROJ. NO.: CP0994

SHEET 41 OF 52

CATALOG NUMBER: A-270560

DATE SAVED: 3/2/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\075-FFZ-MCTE-C750-EROS-DETL.DWG

MASTER ELECTRICAL LEGEND

	EXISTING	NEW	DEMOLITION	ADJUST
L-850C R/W EDGE IN PAVEMENT LIGHT				—
L-862 R/W EDGE ELEVATED LIGHT				—
L-862E R/W END ELEVATED LIGHT				—
L-852G R/W IN-PAVEMENT GUARD LIGHT	—		—	—
L-804 R/W ELEVATED GUARD LIGHT			—	—
R/W MALSR LIGHT				
L-861T T/W EDGE LIGHT				
L-853 RETRO-REFLECTIVE MARKER				
L-853 RETRO-REFLECTIVE MARKER ON J-BOX	—		—	—
RUNWAY/TAXIWAY SIGN				—
L-867 JUNCTION BOX (3)				
HAND HOLE			—	
ELECTRICAL MANHOLE	EMH	EMH	—	EMH
2" ELECTRICAL CONDUIT (DEB) (1)			—	—
2" ELECTRICAL CONDUIT (CE) (1)			—	—
2" ELECTRICAL CONDUIT (CLSM)	—		—	—
ELECTRICAL DUCT BANK (DEB) (2)			—	—
ELECTRICAL DUCT BANK (CE) (2)			—	—
L-824C CABLE (HASH MARKS INDICATE THE NUMBER OF CONDUCTORS)	2	3	—	—

ABBREVIATIONS LEGEND (NOT ALL ABBREVIATIONS ARE USED)

A	-	AMP	OHT	-	OVERHEAD TELEPHONE
AFF	-	ABOVE FINISHED FLOOR	P	-	PHASE
AFG	-	ABOVE FINISHED GRADE	PAPI	-	PRECISION APPROACH PATH INDICATOR
ATS	-	AUTOMATIC TRANSFER SWITCH	PT	-	POINT OF TANGENCY
BC	-	BARE COPPER	PVC	-	POLYVINYL CHLORIDE CONDUIT
C	-	CONDUIT	REIL	-	RUNWAY END INDICATOR LIGHT
CCR	-	CONSTANT CURRENT REGULATOR	RGL	-	RUNWAY GUARD LIGHT
CE	-	CONCRETE ENCASED	RGS	-	RIGID GALVANIZED STEEL CONDUIT
CKT.	-	CIRCUIT	RE	-	REFER TO
CLSM	-	CONTROLLED LOW STRENGTH MATERIAL	RW	-	RUNWAY
COMM.	-	COMMUNICATION	S	-	SEWER
CONC.	-	CONCRETE	SCHD.	-	SCHEDULE
DEB	-	DIRECT EARTH BURIED	SHT.	-	SHEET
ELEC.	-	ELECTRIC/ELECTRICAL	STA.	-	STATION
EXIST., EX.	-	EXISTING	TDZ	-	TOUCH DOWN ZONE
FAA	-	FEDERAL AVIATION ADMINISTRATION	TW	-	TAXIWAY
F.O.	-	FIBER OPTIC	TYP	-	TYPICAL
GFI	-	GROUND FAULT INTERRUPTING	UE, UGE	-	UNDERGROUND ELECTRICAL
GND., G	-	GROUND	U.G.	-	UNDERGROUND
HDPE	-	HIGH-DENSITY POLYETHYLENE	UON	-	UNLESS OTHERWISE NOTED
kV	-	KILOVOLTS	UT	-	UNDERGROUND TELEPHONE
kW	-	KILOWATTS	V	-	VOLT
MALSR	-	MEDIUM INTENSITY APPROACH LIGHT SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS	VA	-	VOLT AMP
MH.	-	MANHOLE	W	-	WATT, WIRE
N.I.C.	-	NOT IN CONTRACT	W/	-	WITH
NO.	-	NUMBER	WP	-	WEATHERPROOF
OHP	-	OVERHEAD POWER	XFMR	-	TRANSFORMER

R/W LIGHT KEY

C - WHITE
Y - YELLOW
G - GREEN
R - RED

CIRCUIT LEGEND

1. RUNWAY 4L-22R EDGE LIGHTS
2. TAXIWAY D EDGE LIGHTS
3. RGL LIGHTS
4. RUNWAY 4R-22L EDGE LIGHTS

LEGEND NOTES:

1. ALL ELECTRICAL CONDUITS ARE 1-2" SCH. 40 PVC CONDUIT UNLESS IDENTIFIED OTHERWISE.
2. SIZE AND NUMBER OF CONDUITS IN A DUCT BANK ARE AS INDICATED ON PLAN SHEETS.
3. ALL L-867 JUNCTION BOXES ARE SIZE B, 12" DIA. X 24" DEEP WITH 3/8" THICK BLANK COVER, UNLESS OTHERWISE INDICATED.

PROJECT SPECIFIC DEMOLITION NOTES

1. THE CONTRACTOR SHALL REMOVE AND PROPERLY STORE THE RUNWAY/TAXIWAY LIGHTS AND GUIDANCE SIGNS ACCORDING TO THE ELECTRICAL DEMOLITION PLAN SHEETS E100 SERIES. THE STORAGE OF THE LIGHTS AND SIGNS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND IS CONSIDERED INCIDENTAL TO REMOVAL ITEMS. NO SEPARATE PAYMENT WILL BE MADE. ALL ITEMS SHALL BE NEATLY PACKAGED AND TURNED OVER TO THE SPONSOR.
2. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA AND CLOSED PORTIONS OF THE AIRFIELD SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY JUMPER AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
3. PRIOR TO BEGINNING ELECTRICAL DEMOLITION, THE CONTRACTOR SHALL PROVIDE A PLAN TO THE ENGINEER DETAILING THE INSTALLATION OF ALL REQUIRED TEMPORARY JUMPERS. THE PLAN SHALL SHOW THE LOCATIONS AND INSTALLATION TECHNIQUES OF ALL JUMPERS AND SHALL DEMONSTRATE TO THE ENGINEER THE CONTRACTOR'S PLAN TO MAINTAIN THE INTEGRITY OF THE AIRFIELD CIRCUITS FOR THE DURATION OF CONSTRUCTION.
4. THE CONTRACTOR SHALL REMOVE ALL WIRES AND CABLES FROM CONDUITS WHICH ARE TO BE ABANDONED. NO ADDITIONAL PAYMENT WILL BE MADE FOR REMOVAL OF WIRES AND CABLES.

ELECTRICAL NOTES

1. THE PROJECT PAY ITEMS PROVIDED ARE TO BE INCLUSIVE OF ALL WORK TO BE PERFORMED AS SHOWN IN THE CONTRACT DOCUMENTS. ALL WORK NOT IDENTIFIED WITH A SPECIFIC PAY ITEM IS TO BE CONSIDERED REQUIRED WORK TO COMPLETE THE PROJECT, AND IS TO BE INCIDENTAL TO THE COST OF PROJECT PAY ITEMS PROVIDED.
2. WHENEVER, IN THE CONTRACT DOCUMENTS, THE WORDS "PROVIDE", "INSTALL", "FURNISH AND INSTALL", OR SIMILAR WORDS ARE USED, IT SHALL BE UNDERSTOOD THAT THE INTENT OF THE CONTRACT DOCUMENT IS TO PROVIDE FOR THE CONSTRUCTION AND COMPLETION IN EVERY DETAIL THE WORK DESCRIBED. IT IS FURTHER INTENDED THAT THE CONTRACTOR SHALL FURNISH ALL LABOR, SUPERVISION, MATERIALS, EQUIPMENT, TOOLS, TRANSPORTATION, SUPPLIES, TESTING, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK IN ACCORDANCE WITH THE DRAWINGS (PLANS), SPECIFICATIONS, AND TERMS OF THE CONTRACT.
3. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, LICENSES, ETC., PRIOR TO COMMENCEMENT OF WORK. THE COST OF PERMITS, LICENSES, ETC. SHALL BE INCIDENTAL TO, AND INCLUDED IN THE BID PRICE FOR THE RESPECTIVE PAY ITEMS.
4. ALL DAMAGE TO UTILITIES OR EXISTING STRUCTURES FROM CONSTRUCTION ACTIVITIES SHALL BE IMMEDIATELY REPORTED TO THE RESIDENT ENGINEER. THE RESIDENT ENGINEER SHALL DETERMINE WHETHER REPAIR OR REPLACEMENT IS NECESSARY. ALL REPAIR METHODS SHALL BE SUBMITTED TO THE RESIDENT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INITIATING THE WORK.
5. IN NEW OR EXISTING PAVEMENT ALL CONDUITS, DUCT BANKS, BASE CANS, COUNTERPOISE, GROUND CONDUCTORS, ETC. SHALL BE INSTALLED PRIOR TO PLACEMENT OF THE FINAL LIFT OF PAVEMENT.
6. AIRFIELD SIGNS PROVIDING DIRECTIONS TO CLOSED AREAS SHALL BE COVERED. ALL AREAS CLOSED TO AIRCRAFT SHALL NOT BE LIGHTED. ADEQUATE LIGHTING, IN THE OPINION OF THE RESIDENT ENGINEER, SHALL BE PROVIDED TO DELINEATE THE ACTIVE AND CLOSED AREAS OF THE AOA. THE ABOVE ITEMS ARE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS.
7. ALL COMPONENTS OF THE AIRFIELD LIGHTING SYSTEM OUTSIDE OF THE PROJECT AREA AND CLOSED PORTIONS OF THE AIRFIELD SHALL BE OPERATIONAL AT THE END OF EACH WORK SHIFT AND FOR EVERY PERIOD OF LOW VISIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL TEMPORARY JUMPER AND OTHER EQUIPMENT NECESSARY TO MAINTAIN AN OPERATIONAL SYSTEM DURING CONSTRUCTION. TEMPORARY JUMPERS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS BID ITEMS. ALL TEMPORARY JUMPERS SHALL BE INSTALLED IN CONDUIT.
8. CONTRACTOR SHALL BE REQUIRED TO PROVE TO THE SATISFACTION OF THE PROJECT ENGINEER THAT THE LIGHTING SYSTEM IS OPERATIONAL BEFORE LEAVING THE WORK SITE AFTER EVERY WORK SHIFT.
9. THE AIRPORT MAINTENANCE DEPARTMENT'S "LOCKOUT/TAGOUT" PROCEDURE AND NFPA 70E SHALL BE COMPLIED WITH BY THIS CONTRACTOR.
10. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING WORK.
11. EXISTING CONDUIT, DUCT BANK, CIRCUITING, AND UTILITY INFORMATION IS BASED ON "AS-BUILT" AND "RECORD" DRAWINGS AND SITE VISITS BY THE ENGINEER. THE EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND SHALL NOT BE SCALED FOR EXACT LOCATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE APPROPRIATE UTILITY/AGENCY PRIOR TO STARTING WORK AND STAKE/MARK THE LOCATION OF ALL EXISTING UTILITIES. ANY INTERRUPTION OF AN EXISTING SYSTEM OR UTILITY SERVICE SHALL BE COORDINATED AND APPROVED BY THE AIRPORT AND THE AUTHORITY, AGENCY, OR UTILITY HAVING JURISDICTION PRIOR TO STARTING WORK.
12. ALL REMOVED FIXTURES, BASEPLATES, SPACERS, SIGNS, TRANSFORMERS, ETC. SHALL BE TURNED OVER TO THE AIRPORT'S MAINTENANCE DEPARTMENT. ALL REMOVED CABLES, DUCT, BASECANS, CONCRETE PADS, MANHOLES, ETC. SHALL BE PROPERLY AND LEGALLY DISPOSED OF OFF THE SITE BY THE CONTRACTOR. ALL ITEMS TO BE RELOCATED SHALL BE REMOVED FIRST AND PROPERLY STORED FOR FUTURE INSTALLATION.
13. PROVIDE WORK, EQUIPMENT AND MATERIALS THAT COMPLY WITH FAA REQUIREMENTS, NATIONAL ELECTRICAL CODE, AND ALL LOCAL CODES.
14. PROVIDE PROPER CONSTRUCTION WARNINGS AND BARRICADES PER FAA REQUIREMENTS, AND PRESENT PLANS FOR SAME TO ENGINEER AND AIRPORT OPERATIONS MANAGER FOR APPROVAL PRIOR TO COMMENCING WORK.
15. NOTIFY ENGINEER OF ANY SIGNIFICANT DIFFERENCES BETWEEN DRAWINGS AND FIELD CONDITIONS.
16. DAMAGE TO EXISTING EQUIPMENT NOT ASSOCIATED WITH DEMOLITION FOR THIS PROJECT TO BE REPAIRED AND OPERATIONAL AT CONTRACTOR'S EXPENSE.
17. LOCATION OF EXISTING UTILITIES AND STRUCTURES IS BASED ON THE BEST AVAILABLE INFORMATION AND IS NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL UTILITIES ARE SHOWN.
18. WHERE NEW DUCT BANKS OR OTHER UTILITIES ARE NEAR EXISTING UTILITIES THE CONTRACTOR SHALL HAND EXCAVATE AROUND THE EXISTING UTILITIES IN ORDER TO PREVENT DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMMEDIATELY REPAIRING ANY UTILITY DAMAGED DURING CONSTRUCTION.
19. THE CONTRACTOR SHALL REMOVE ALL CONDUIT AND CONDUCTORS MARKED FOR REMOVAL ON DEMOLITION SHEETS. ALL ABANDONED/UNUSED CONDUCTORS SHALL BE REMOVED FROM EXISTING CONDUITS IN WHICH NEW CONDUCTORS ARE INSTALLED. NO ABANDONED CONDUCTORS SHALL BE LEFT IN PLACE AT THE COMPLETION OF THE JOB. NO PAYMENT WILL BE MADE FOR REMOVAL OF EXISTING CONDUCTORS. ALL REMOVED WIRE SHALL BE THE PROPERTY OF THE CONTRACTOR.
20. THE CONTRACTOR SHALL KEEP A SET OF AS-BUILT DRAWINGS THAT SHALL BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF THE JOB. THE CONTRACTOR SHALL NOTE, AND BRING TO THE ENGINEER'S ATTENTION, ANY DISCREPANCIES BETWEEN THE PLANS AND ACTUAL FIELD CONDITIONS. REDLINES AND SURVEY AUTOCAD AS-BUILTS SHALL BE PROVIDED UPON COMPLETION.
21. THE DIMENSION BETWEEN LIGHTS SHOWN ON A RADIUS IS DEFINED AS THE CHORD LENGTH. LOCATIONS SHOWN ARE TO THE CENTER OF THE LIGHTING FIXTURE.
22. CONTRACTOR TO FIELD VERIFY ALL ELEVATION ADJUSTMENTS PRIOR TO ORDERING EXTENSION RINGS OR EXCAVATING ELECTRICAL STRUCTURES.
23. AT LOCATIONS WHERE NEW RUNWAY LIGHTS, TAXIWAY LIGHTS, SIGNS, OR CONDUIT ARE TO BE INSTALLED IN EXISTING PAVEMENT THE CONTRACTOR SHALL NEATLY SAWCUT, REMOVE, AND PATCH EXISTING PAVEMENT AS NECESSARY TO ALLOW THE INSTALLATION OF THE NEW EQUIPMENT. PAVEMENT REMOVAL AND PATCHING SHALL BE CONSIDERED INCIDENTAL TO INSTALLATION OF THE NEW EQUIPMENT. NO ADDITIONAL PAYMENT WILL BE MADE FOR PAVEMENT REMOVAL AND PATCHING.
24. THE ELECTRICAL CONTRACTOR SHALL ATTEND THE CONSTRUCTION MEETINGS FOR THE DURATION OF THE PROJECT.
25. ALL ELECTRICAL WORK, INCLUDING CONDUITS, HANDHOLES, GROUNDING, POWER DISTRIBUTION EQUIPMENT, WIRING, JUNCTION BOXES, ETC., PERTAINING TO NAVIGATIONAL AIDS (LOCALIZER, LOCALIZER EQUIPMENT SHELTER, REILS, AND PAPI) SHALL BE CONSTRUCTED IN ACCORDANCE WITH FAA SPECIFICATIONS FAA-C-1217f, FAA-C-1391b, AND FAA-STD-019e IN ADDITION TO THE SPECIFICATIONS CONTAINED WITHIN THE CONTRACT DOCUMENTS.
26. THE CONTRACTOR SHALL MEASURE THE INSULATION RESISTANCE OF ALL AIRFIELD CIRCUITS PRIOR TO STARTING ANY ELECTRICAL WORK. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE A MEGOHMMETER TO THE AIRPORT'S MAINTENANCE DEPARTMENT. THE MEGOHMMETER SHALL BE CAPABLE OF TESTING INSULATION RESISTANCE AT 500V AND 1000V. THE TESTER SHALL BE CAPABLE OF MEASURING RESISTANCE VALUES BETWEEN 0.01MΩ AND 2000MΩ WITH A MINIMUM ACCURACY OF ±1.5%. MEGOHMMETER SHALL BE FLUKE 1503, OR APPROVED EQUAL.
27. THE CONTRACTOR'S OPTION, NEW CONDUIT PROVIDED UNDER EXISTING PAVEMENT MAY BE INSTALLED BY DIRECTIONAL BORING IN LIEU OF CUTTING AN OPEN TRENCH AS DESCRIBED ABOVE. ALL CONDUIT INSTALLED BY DIRECTIONAL BORING SHALL BE SCHEDULE 40 HDPE. HDPE CONDUIT SHALL NOT BE USED OUTSIDE OF DIRECTIONAL BORING APPLICATIONS. ANY DAMAGE TO EXISTING PAVEMENT FROM BORING OPERATIONS (INCLUDING HEAVING) SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE SPONSOR, AND TO THE APPROVAL OF THE ENGINEER.
28. CONDUITS, ELECTRIC LINES, AND DUCT BANKS MARKED FOR REMOVAL ON UTILITY DEMOLITION SHEETS MAY BE ABANDONED IN PLACE IF THEY ARE NOT DISTURBED DURING CONSTRUCTION ACTIVITIES. ANY CONDUIT, ELECTRIC LINES, OR DUCT BANK ENCOUNTERED DURING CONSTRUCTION SHALL BE REMOVED. NO PAYMENT SHALL BE MADE FOR REMOVAL OF CONDUITS, DUCT BANKS, AND ELECTRIC LINES.
29. THE CONTRACTOR SHALL REMOVE ALL ABANDONED/UNUSED CONDUCTORS AND CABLES FROM EXISTING CONDUITS IN WHICH NEW CONDUCTORS OR CABLES ARE INSTALLED. NO ABANDONED CONDUCTORS OR CABLES SHALL BE LEFT IN PLACE AT THE COMPLETION OF THE PROJECT. NO PAYMENT WILL BE MADE FOR REMOVAL OF EXISTING CONDUCTORS OR CABLES. ALL REMOVED CONDUCTORS AND CABLES SHALL BE THE PROPERTY OF THE CONTRACTOR.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 59247 JON BRYCE WEEKS Date Signed 3/06/23 ARIZONA, U.S.A.

CITY OF MESA ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL LEGEND

DRAWING: E001

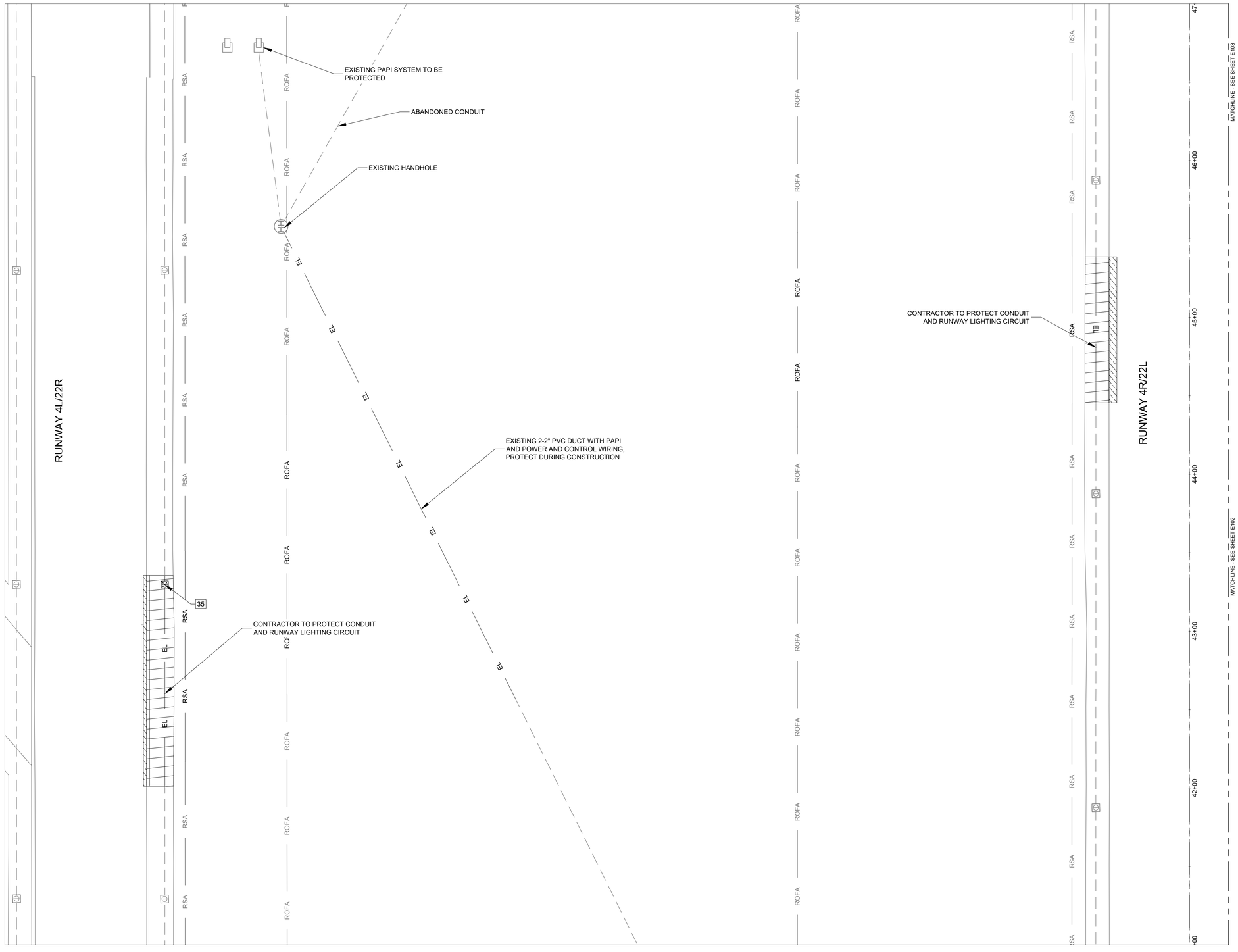
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET: 42 OF 52

CATALOG NUMBER: A-270561

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\100-FFZ-MCTE-E001-ELEC-LGND.DWG

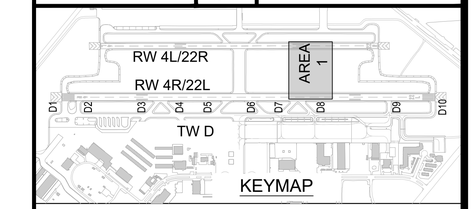


ELECTRICAL DEMOLITION NOTES

35	L-125a REMOVE BASE MOUNTED RUNWAY/TAXIWAY LIGHT, COMPLETE 1 EA.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



ELECTRICAL DEMOLITION LEGEND

	EXISTING TAXIWAY EDGE LIGHT
	EXISTING RUNWAY EDGE LIGHT
EL	REMOVE ELECTRICAL LINES
EL(AB)	ABANDONED ELECTRICAL LINE TO BE REMOVED
	RUNWAY EDGE LIGHT TO BE REMOVED
	TAXIWAY EDGE LIGHT TO BE REMOVED
	JUNCTION BOX TO BE REMOVED
	RUNWAY GUARD LIGHT TO BE REMOVED
	AIRFIELD GUIDANCE SIGN TO BE REMOVED

NOTES:

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND ELECTRICAL NOTES.
2. SEE SHEETS E101 AND E103 FOR ELECTRICAL DEMOLITION SHEETS.
3. SEE SHEETS E201 AND E203 FOR ELECTRICAL LAYOUT PLAN SHEETS.
4. SEE SHEETS E250 - E253 FOR ELECTRICAL DETAILS.
5. ALL CONDUIT AND WIRE REMOVAL AND DISPOSAL IS INCIDENTAL TO THE PROJECT.

CONTRACTOR TO PROTECT ALL EXISTING CONDUIT, WIRE, AND CIRCUITS TO BE REMOVED AS IDENTIFIED IN THE ELECTRICAL DEMOLITION PLANS UNTIL PROPOSED CONDUIT AND WIRE IS INSTALLED TO LIMIT THE SERVICE INTERRUPTION. ONCE CIRCUITS ARE REROUTED THROUGH PROPOSED CONDUIT, EXISTING CONDUIT AND WIRE CAN BE REMOVED.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer
CERTIFICATE NO.
59247
JON BRYCE WEEKS
3/29/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL DEMOLITION PLAN AREA 1 (SCHEDULE II)

DRAWING: E101

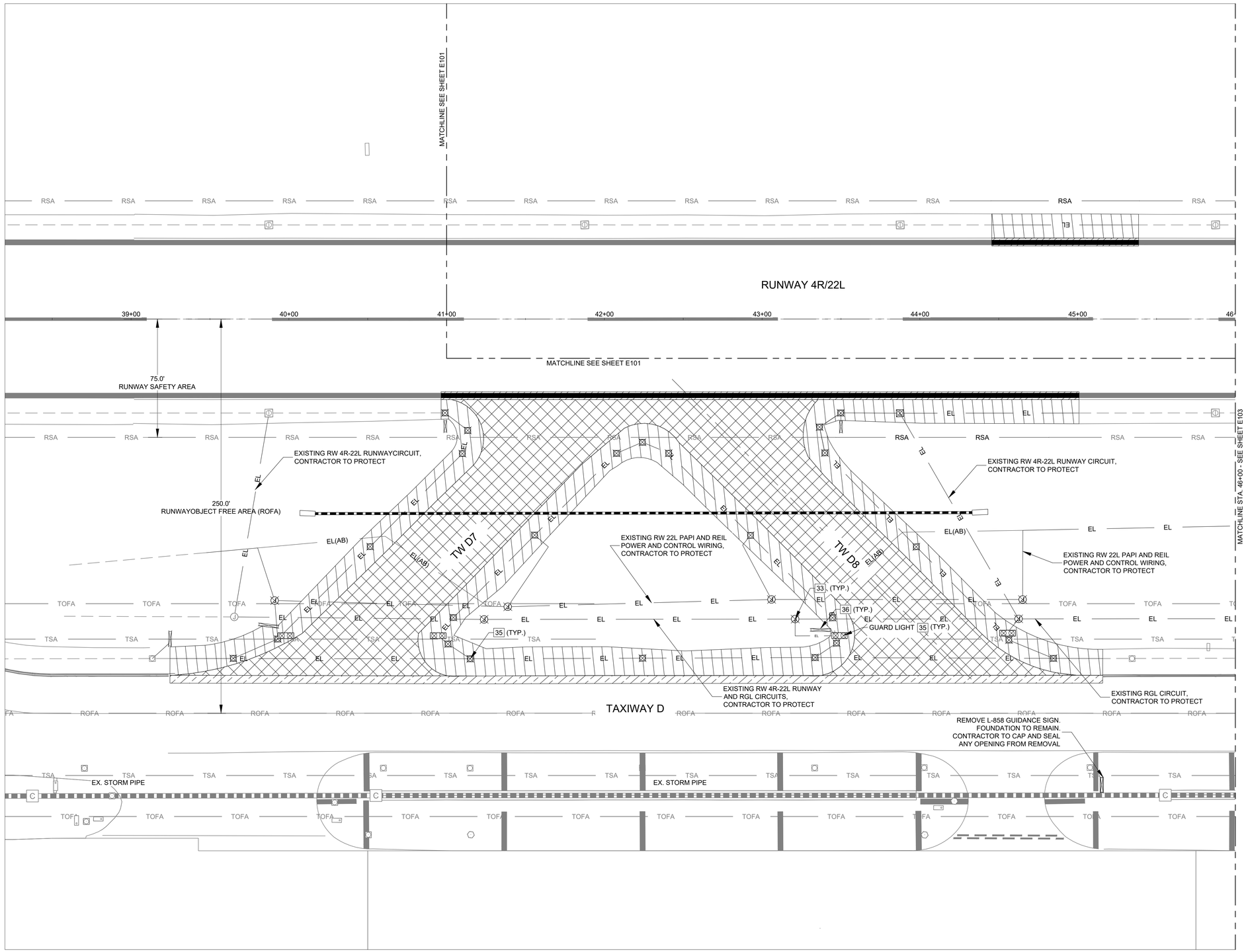
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY: ---
PROJ. NO.: CP0994

SHEET 43 OF 52

CATALOG NUMBER: A-270562

DATE SAVED: 3/31/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\100-FFZ-MCTE-E101-ELEC-DEMO.DWG



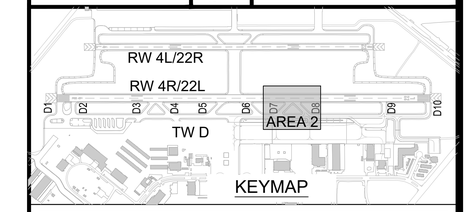
ELECTRICAL DEMOLITION NOTES

33	L-115a REMOVE JUNCTION BOX, COMPLETE	7 EA.
35	* L-125a REMOVE BASE MOUNTED RUNWAY/TAXIWAY LIGHT, COMPLETE	29 EA.
36	L-125b REMOVE L-858 GUIDANCE SIGN, COMPLETE	6 EA.

* NOTE: FOUR EXISTING GUARD LIGHTS ARE QUANTIFIED UNDER THIS PAY ITEM

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



ELECTRICAL DEMOLITION LEGEND

	EXISTING TAXIWAY EDGE LIGHT
	EXISTING RUNWAY EDGE LIGHT
EL	REMOVE ELECTRICAL LINES
EL(AB)	ABANDONED ELECTRICAL LINE TO BE REMOVED
	RUNWAY EDGE LIGHT TO BE REMOVED
	TAXIWAY EDGE LIGHT TO BE REMOVED
	JUNCTION BOX TO BE REMOVED
	RUNWAY GUARD LIGHT TO BE REMOVED
	AIRFIELD GUIDANCE SIGN TO BE REMOVED

NOTES:

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND ELECTRICAL NOTES.
2. SEE SHEETS E101 AND E103 FOR ELECTRICAL DEMOLITION SHEETS.
3. SEE SHEETS E201 AND E203 FOR ELECTRICAL LAYOUT PLAN SHEETS.
4. SEE SHEETS E250 - E253 FOR ELECTRICAL DETAILS.
5. ALL CONDUIT AND WIRE REMOVAL AND DISPOSAL IS INCIDENTAL TO THE PROJECT.

CONTRACTOR TO PROTECT ALL EXISTING CONDUIT, WIRE, AND CIRCUITS TO BE REMOVED AS IDENTIFIED IN THE ELECTRICAL DEMOLITION PLANS UNTIL PROPOSED CONDUIT AND WIRE IS INSTALLED TO LIMIT THE SERVICE INTERRUPTION. ONCE CIRCUITS ARE REROUTED THROUGH PROPOSED CONDUIT, EXISTING CONDUIT AND WIRE CAN BE REMOVED.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 69241 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL DEMOLITION PLAN AREA 2 (SCHEDULE I)

DRAWING: E102

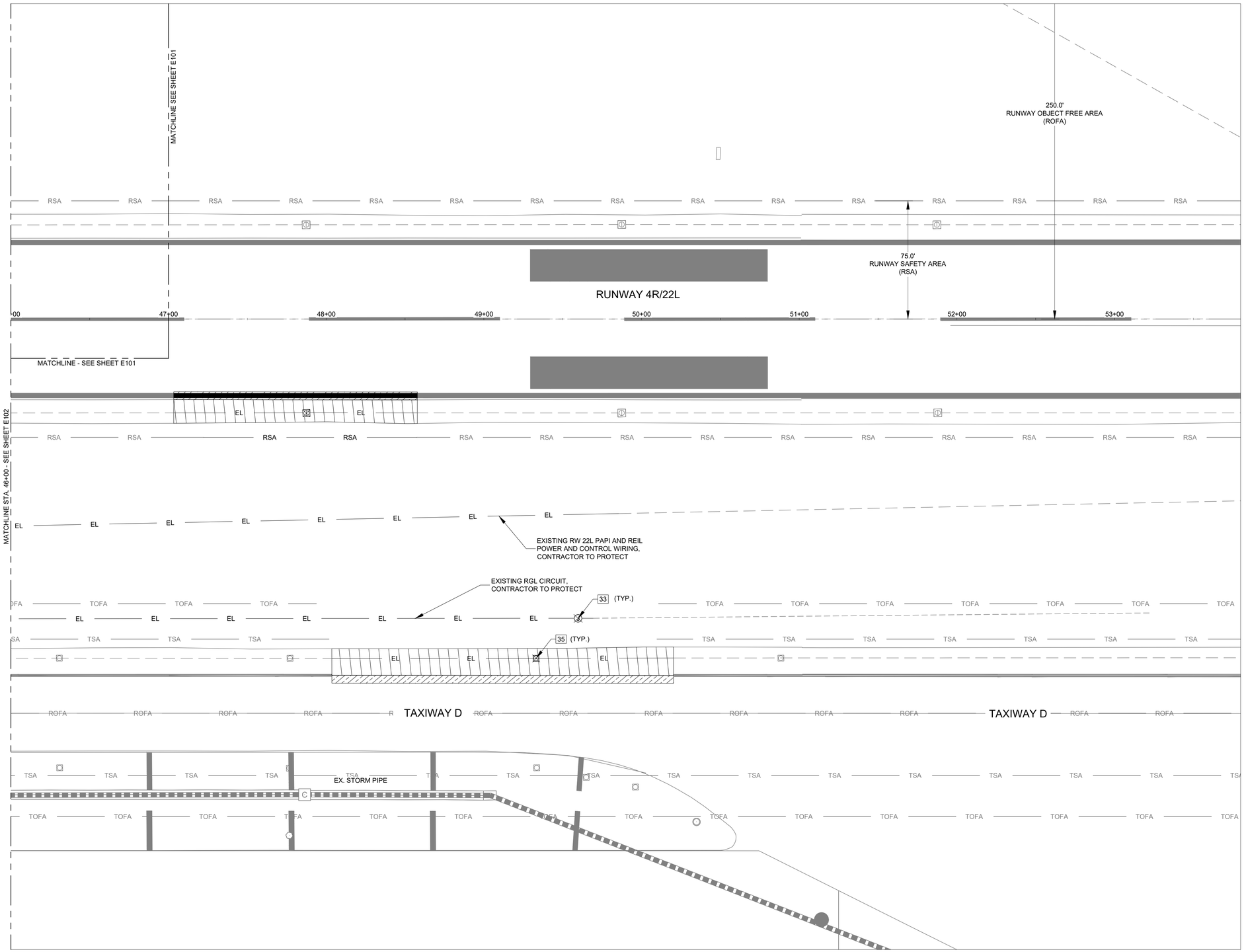
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET: 44 OF 52

CATALOG NUMBER: A-270563

DATE SAVED: 3/31/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\100-FFZ-MCTE-E102-ELEC-DEMO.DWG

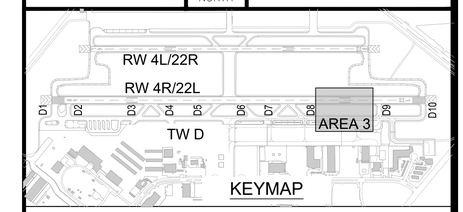


ELECTRICAL DEMOLITION NOTES

33	L-115a REMOVE JUNCTION BOX, COMPLETE	1 EA.
35	L-125a REMOVE BASE MOUNTED RUNWAY/TAXIWAY LIGHT, COMPLETE	2 EA.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



KEYMAP

ELECTRICAL DEMOLITION LEGEND

- EXISTING TAXIWAY EDGE LIGHT
- EXISTING RUNWAY EDGE LIGHT
- EL — REMOVE ELECTRICAL LINES
- EL(AB) — ABANDONED ELECTRICAL LINE TO BE REMOVED
- RUNWAY EDGE LIGHT TO BE REMOVED
- TAXIWAY EDGE LIGHT TO BE REMOVED
- JUNCTION BOX TO BE REMOVED
- RUNWAY GUARD LIGHT TO BE REMOVED
- AIRFIELD GUIDANCE SIGN TO BE REMOVED

NOTES:

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND ELECTRICAL NOTES.
2. SEE SHEETS E101 AND E103 FOR ELECTRICAL DEMOLITION SHEETS.
3. SEE SHEETS E201 AND E203 FOR ELECTRICAL LAYOUT PLAN SHEETS.
4. SEE SHEETS E250 - E253 FOR ELECTRICAL DETAILS.
5. ALL CONDUIT AND WIRE REMOVAL AND DISPOSAL IS INCIDENTAL TO THE PROJECT.

CONTRACTOR TO PROTECT ALL EXISTING CONDUIT, WIRE, AND CIRCUITS TO BE REMOVED AS IDENTIFIED IN THE ELECTRICAL DEMOLITION PLANS UNTIL PROPOSED CONDUIT AND WIRE IS INSTALLED TO LIMIT THE SERVICE INTERRUPTION. ONCE CIRCUITS ARE REROUTED THROUGH PROPOSED CONDUIT, EXISTING CONDUIT AND WIRE CAN BE REMOVED.

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE
62247
JON BRYCE WEEKS
3/29/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL DEMOLITION PLAN
AREA 3 (SCHEDULE I)

DRAWING
E103

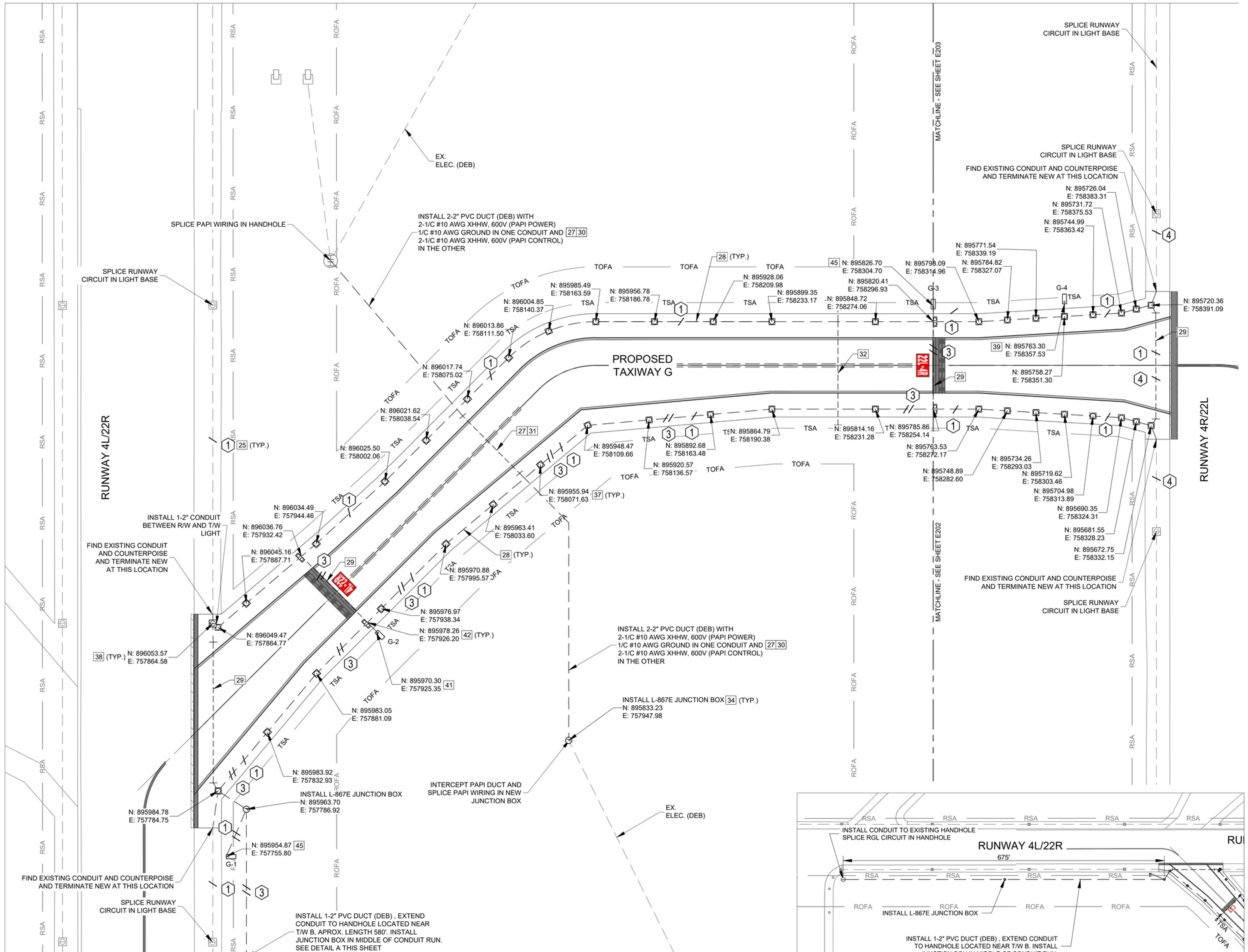
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET
45 OF 52

CATALOG NUMBER:
A-270564

DATE SAVED: 3/31/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\100-FFZ-MCTE-E102-ELEC-DEMO.DWG

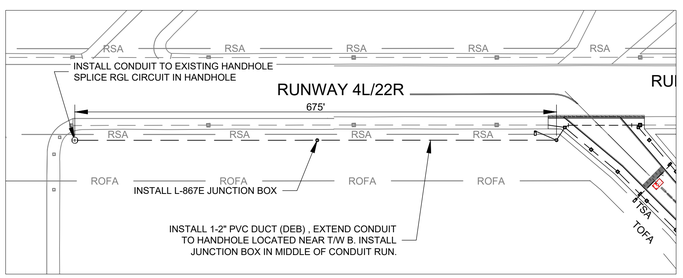


ELECTRICAL GEOMETRY NOTES

#	ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
25	L-108A	INSTALL #8 AWG L-824C, 5000V WIRE	LF	5000
26	L-108B	INSTALL #6 AWG, BARE COPPER COUNTERPOISE INCLUDING GROUND RODS AND TERMINATIONS	LF	4000
27	L-108C	INSTALL #10 AWG XHHW, 600V WIRE	LF	2000
28	L-110A	INSTALL 1-2" SCH 40 PVC CONDUIT (DEB)	LF	3100
29	L-110B	INSTALL 1-2" SCH 40 PVC CONDUIT (CE)	LF	300
30	L-110C	INSTALL 2-2" SCH 40 PVC CONDUIT (DEB)	LF	325
31	L-110D	INSTALL 2-2" SCH 40 PVC CONDUIT (CE)	LF	55

ELECTRICAL GEOMETRY NOTES

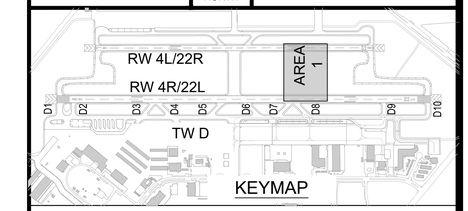
#	ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
32	L-110E	INSTALL 4-2" SCH 40 PVC CONDUIT (CE)	LF	75
34	L-115B	INSTALL L-867E JUNCTION BOX, COMPLETE	EA	3
37	L-125C	INSTALL L-861T LED TAXIWAY EDGE LIGHT, COMPLETE	EA	41
38	L-125D	INSTALL L-861 LED RUNWAY EDGE LIGHT, COMPLETE	EA	1
39	L-125E	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 2 MODULE, COMPLETE	EA	1
41	L-125G	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 4 MODULE, COMPLETE	EA	2
42	L-125H	INSTALL L-804 LED RUNWAY GUARD LIGHT, COMPLETE	EA	4
45	L-125K	INSTALL L-858 LED GUIDANCE SIGN SIZE 1, 1 MODULE, COMPLETE	EA	1



1 DETAIL A
1" = 100'

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



NOTES:

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND ELECTRICAL NOTES.
2. SEE SHEETS E101 AND E103 FOR ELECTRICAL DEMOLITION SHEETS.
3. SEE SHEETS E250 - E253 FOR ELECTRICAL DETAILS.

CIRCUIT LEGEND

1	RUNWAY 4L-22R EDGE LIGHTS
2	TAXIWAY D EDGE LIGHTS
3	RGL LIGHTS
4	RUNWAY 4R-22L EDGE LIGHTS

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 59247 JON BRYCE WEEKS 3/29/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL GEOMETRY PLAN AREA 1 (SCHEDULE II)

DRAWING E201

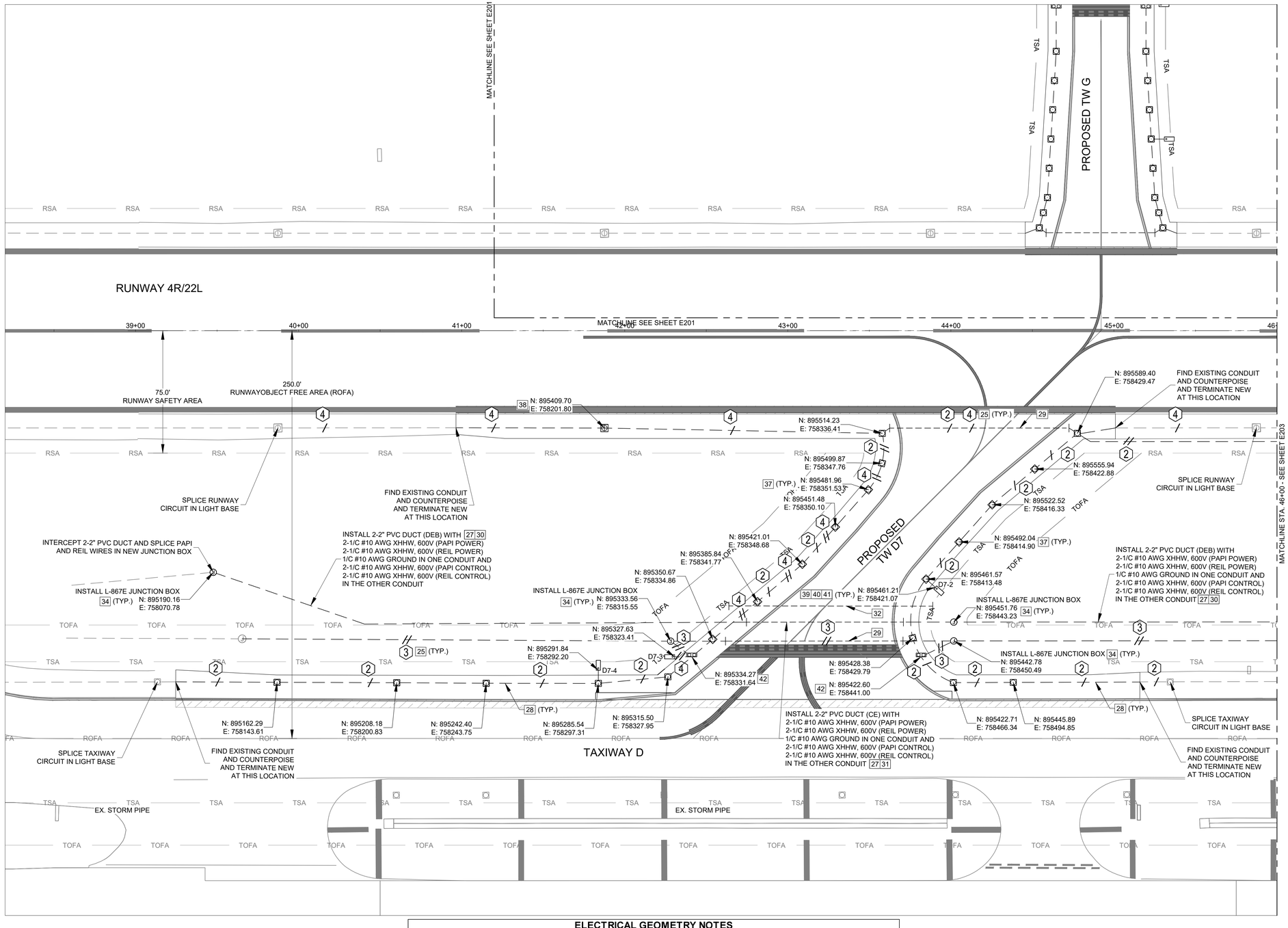
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 46 OF 52

CATALOG NUMBER: A-270565

DATE SAVED: 3/31/23
L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\200-FFZ-MCTE-E201-ELEC-GMTY.DWG

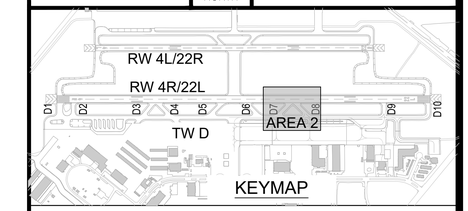


ELECTRICAL GEOMETRY NOTES

#	ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
25	L-108A	INSTALL #8 AWG L-824C, 5000V WIRE	LF	3750
26	L-108B	INSTALL #6 AWG, BARE COPPER COUNTERPOISE INCLUDING GROUND RODS AND TERMINATIONS	LF	3500
27	L-108C	INSTALL #10 AWG XHHW, 600V WIRE	LF	6200
28	L-110A	INSTALL 1-2" SCH 40 PVC CONDUIT (DEB)	LF	2400
29	L-110B	INSTALL 1-2" SCH 40 PVC CONDUIT (CE)	LF	225
30	L-110C	INSTALL 2-2" SCH 40 PVC CONDUIT (DEB)	LF	575
31	L-110D	INSTALL 2-2" SCH 40 PVC CONDUIT (CE)	LF	100
32	L-110E	INSTALL 4-2" SCH 40 PVC CONDUIT (CE)	LF	130
34	L-115B	INSTALL L-867E JUNCTION BOX, COMPLETE	EA	4
37	L-125C	INSTALL L-861T LED TAXIWAY EDGE LIGHT, COMPLETE	EA	20
38	L-125D	INSTALL L-861 LED RUNWAY EDGE LIGHT, COMPLETE	EA	1
40	L-125F	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 3 MODULE, COMPLETE	EA	2
41	L-125G	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 4 MODULE, COMPLETE	EA	1
42	L-125H	INSTALL L-804 LED RUNWAY GUARD LIGHT, COMPLETE	EA	2

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



NOTES:

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND ELECTRICAL NOTES.
2. SEE SHEETS E101 AND E103 FOR ELECTRICAL DEMOLITION SHEETS.
3. SEE SHEETS E250 - E253 FOR ELECTRICAL DETAILS.

CIRCUIT LEGEND

1. RUNWAY 4L-22R EDGE LIGHTS
2. TAXIWAY D EDGE LIGHTS
3. RGL LIGHTS
4. RUNWAY 4R-22L EDGE LIGHTS

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE NO.
69247
JON BRYCE WEEKS
3/29/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL GEOMETRY PLAN AREA 2 (SCHEDULE I)

DRAWING: E202

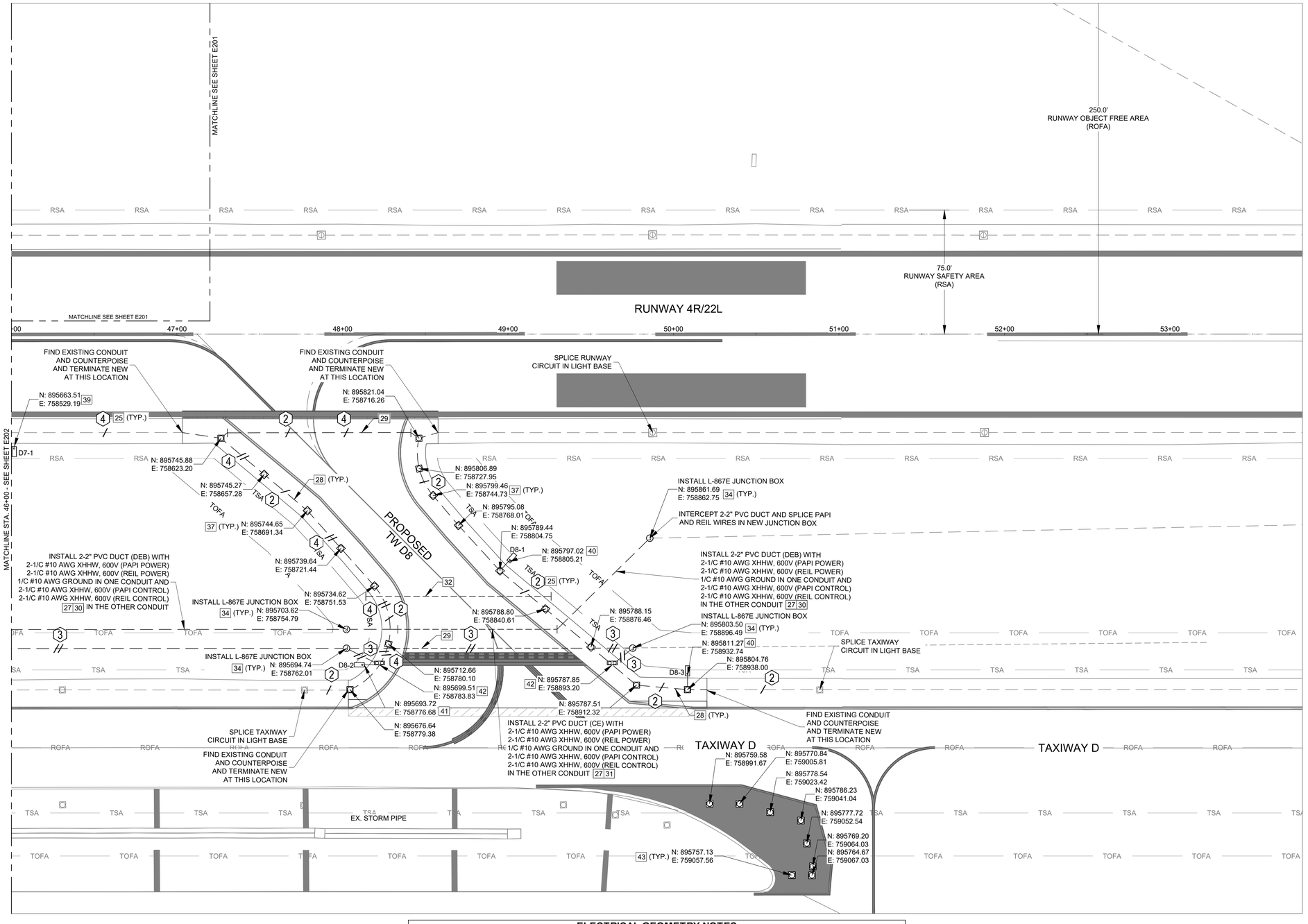
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET: 47 OF 52

CATALOG NUMBER: A-270566

DATE SAVED: 3/31/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CADD\PLANS\200-FFZ-MCTE-E202-ELEC-GMTY.DWG

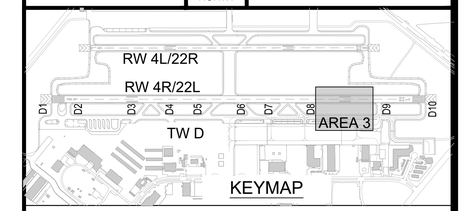


ELECTRICAL GEOMETRY NOTES

#	ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
25	L-108A	INSTALL #8 AWG L-824C, 5000V WIRE	LF	2200
26	L-108B	INSTALL #6 AWG, BARE COPPER COUNTERPOISE INCLUDING GROUND RODS AND TERMINATIONS	LF	1900
27	L-108C	INSTALL #10 AWG XHHW, 600V WIRE	LF	3800
28	L-110A	INSTALL 1-2" SCH 40 PVC CONDUIT (DEB)	LF	1000
29	L-110B	INSTALL 1-2" SCH 40 PVC CONDUIT (CE)	LF	225
30	L-110C	INSTALL 2-2" SCH 40 PVC CONDUIT (DEB)	LF	325
31	L-110D	INSTALL 2-2" SCH 40 PVC CONDUIT (CE)	LF	100
32	L-110E	INSTALL 4-2" SCH 40 PVC CONDUIT (CE)	LF	130
34	L-115B	INSTALL L-867E JUNCTION BOX, COMPLETE	EA	4
37	L-125C	INSTALL L-861T LED TAXIWAY EDGE LIGHT, COMPLETE	EA	16
39	L-125E	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 2 MODULE, COMPLETE	EA	1
40	L-125F	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 3 MODULE, COMPLETE	EA	2
41	L-125G	INSTALL L-858 LED GUIDANCE SIGN, SIZE 1, 4 MODULE, COMPLETE	EA	1
42	L-125H	INSTALL L-804 LED RUNWAY GUARD LIGHT, COMPLETE	EA	2
43	L-125I	INSTALL L-853 RETROREFLECTIVE MARKER, SURFACE MOUNTED, COMPLETE	EA	8

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17



NOTES:

1. SEE SHEET E001 FOR ELECTRICAL LEGEND AND ELECTRICAL NOTES.
2. SEE SHEETS E101 AND E103 FOR ELECTRICAL DEMOLITION SHEETS.
3. SEE SHEETS E250 - E253 FOR ELECTRICAL DETAILS.

CIRCUIT LEGEND

1. RUNWAY 4L-22R EDGE LIGHTS
2. TAXIWAY D EDGE LIGHTS
3. RGL LIGHTS
4. RUNWAY 4R-22L EDGE LIGHTS

GRAPHIC SCALE
30 0 30 60
(IN FEET)
1 " = 30' FULL SIZE
1" = 60' HALF SIZE

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE
69249
JON BRYCE WEEKS
3/29/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL GEOMETRY PLAN AREA 3 (SCHEDULE I)

DRAWING: E203

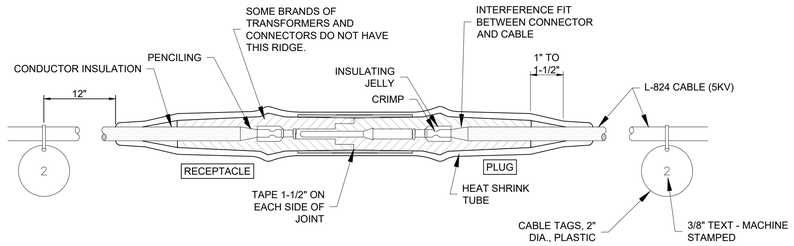
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 48 OF 52

CATALOG NUMBER: A-270567

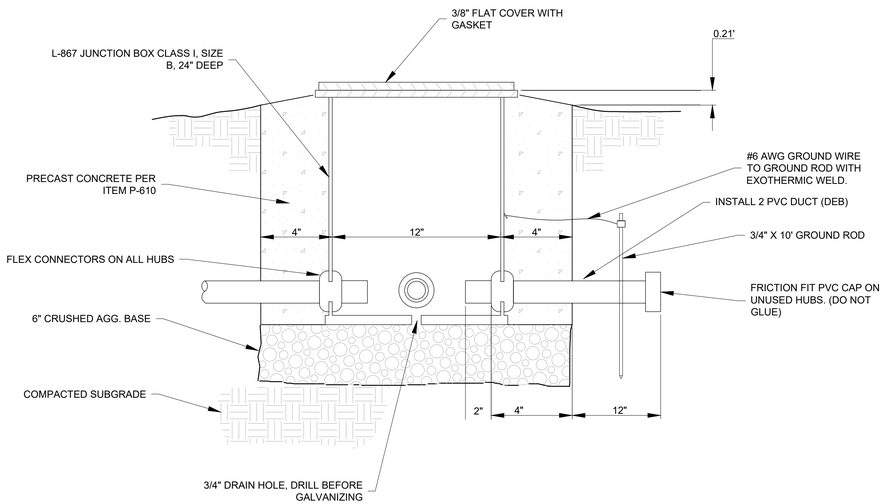
DATE SAVED: 3/31/23
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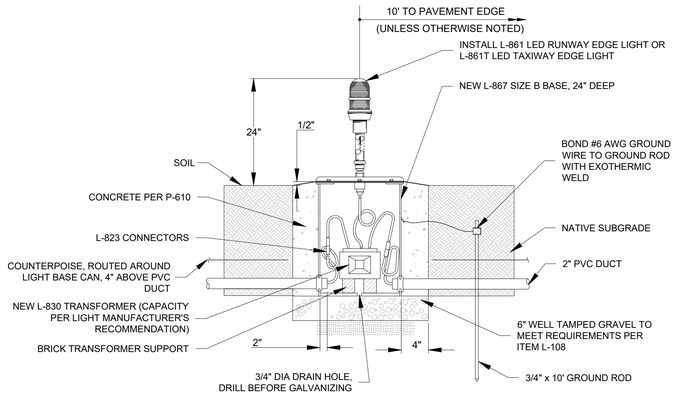
L-823 INSTALLATION INSTRUCTIONS TO SUPPLEMENT THE MANUFACTURERS INSTRUCTIONS

1. CLEAN THE CABLE THOROUGHLY 12" MIN. FROM THE END.
2. REMOVE INSULATION PER MANUFACTURERS INSTRUCTIONS. DO NOT NICK THE CONDUCTOR.
3. INSTALL PIN AND / OR RECEPTACLE WITH A CRIMPING TOOL WHICH MUST BE COMPLETELY CLOSED BEFORE THE TOOL MAY BE REMOVED.
4. BE SURE CABLE AND CONNECTOR FITTINGS ARE CLEAN. COAT THE CABLE INSULATION WITH INSULATING JELLY FROM THE CONNECTOR.
5. CAREFULLY INSERT CABLE INTO CONNECTOR TO THE PROPER DEPTH.
6. CLEAN CONNECTOR AND CABLE INSULATION WITH WAX OR GREASE SOLVENT TO REMOVE SURFACE SILICONE JELLY.
7. SLIP 16 INCH LENGTH OF HEAT SHRINK TUBING WITH INTEGRAL SEALANT ONTO TRANSFORMER LEAD.
8. COMPLETE CONNECTION BY MATING THE PLUG AND RECEPTACLE. CAUTION: BE SURE THE CABLE DOES NOT SLIP OUT WHEN THE CONNECTION IS MADE.
9. APPLY RUBBER TAPE AND VINYL TAPE ONE HALF LAPPED, 1-1/2 INCHES ON EACH SIDE OF JOINT.
10. ANY CONNECTOR WHICH IS CONTAMINATED BY DIRT OR OTHER DAMAGING MATERIAL SHALL BE REMOVED AND NOT REINSTALLED.
11. CENTER HEAT SHRINK OVER THE CONNECTOR. APPLY HEAT EVENLY BEGINNING AT THE CENTER AND WORKING AROUND CABLE TO ENDS. DO NOT OVER HEAT.
12. THE HEAT SOURCE SHALL BE ELECTRIC HEAT GUN OR A PROPANE TORCH WITH A FLAME SPREADER TO BE APPROVED BY THE ENGINEER.
13. CONNECTOR KITS SHALL USE A PULLOVER WATERPROOFING FLAP ON THE CONNECTION, SUCH AS AMERACE SUPER KIT OR INTEGRO COMPLETE KIT. HEAT SHRINK TUBING AND TAPE IS NOT REQUIRED WITH THESE CONNECTORS.
14. ALL L-824 CABLES SHALL BE IDENTIFIED WITH A PLASTIC TAG WITH ITS RESPECTIVE CIRCUIT NUMBER AT ALL ACCESSIBLE LOCATIONS. ALL CABLES WITH L-823 CONNECTORS SHALL HAVE ID TAGS ATTACHED 12" FROM EACH CONNECTOR. IN ADDITION, TAGS SHALL BE PLACED ON ALL CABLES WITHOUT L-823 CONNECTORS 12" FROM CONDUIT OPENINGS IN EACH ELECTRICAL MANHOLE, HAND HOLE, JUNCTION BOX, AND LIGHT BASE.

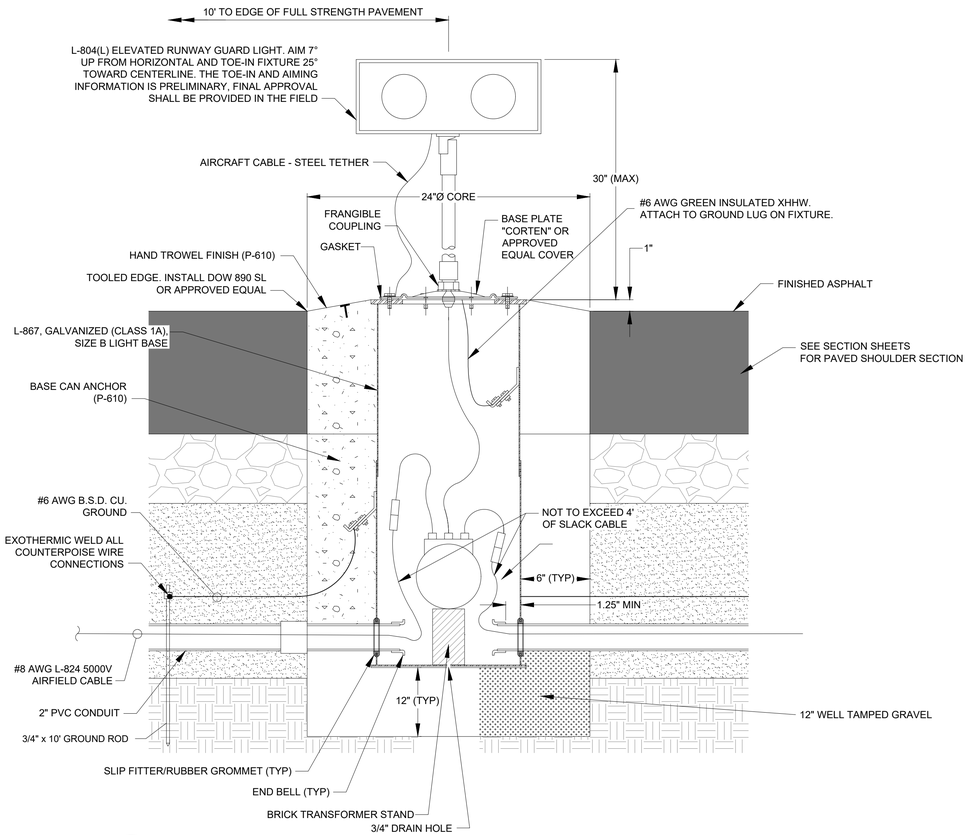
1 L-823 CONNECTOR WATERPROOFING DETAIL
N.T.S.



3 L-867B JUNCTION BOX DETAIL
N.T.S



2 L-861T(L) TAXIWAY EDGE LIGHT DETAIL
N.T.S



4 ELEVATED RUNWAY GUARD LIGHT INSTALLATION IN PAVED SHOULDER
N.T.S

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 59247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL DETAILS

DRAWING E250

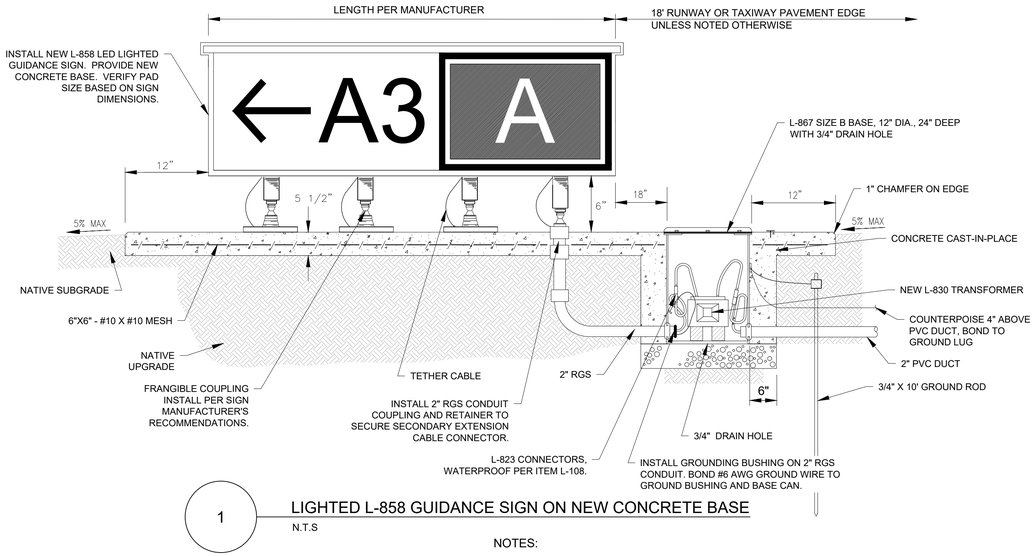
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 49 OF 52

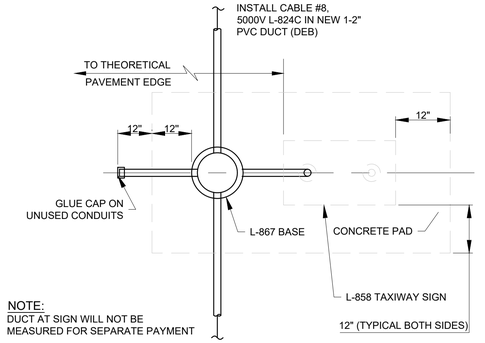
CATALOG NUMBER: A-270568

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\250-FFZ-MCTE-E250-ELEC-DETL.DWG



1 LIGHTED L-858 GUIDANCE SIGN ON NEW CONCRETE BASE

N.T.S



3 CONDUIT LAYOUT TO TAXIWAY SIGN DETAIL

N.T.S

NOTES:

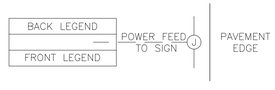
1. ALL LIGHTED SIGNS SHALL BE EQUIPPED WITH LED TYPE LIGHTING WHICH COMPLIES WITH THE REQUIREMENTS OF FAA ENGINEERING BRIEF 67D.
2. ALL NEW SIGNS SHALL CONFORM TO AC 150/5345-44, LIGHTED OR UNLIGHTED, SIZE 1. NUMBER OF SIGN MODULES SHALL BE AS REQUIRED FOR LEGEND. ALL NEW DIRECTIONAL, MANDATORY, AND LOCATION SIGNS SHALL BE LOCATED 20' FROM THE EDGE OF SIGN TO THE PAVEMENT EDGE.
3. THE DETAILS SHOWN IN THE PLANS PROVIDE THE MINIMUM REQUIREMENTS FOR SIGN INSTALLATIONS. THE CONTRACTOR SHALL USE STANDARDS APPLICABLE FOR THE PARTICULAR SIGN MANUFACTURER. THE BOLTING PATTERN, METHOD OF ANCHORING, ETC., SHALL BE PER THE SIGN MANUFACTURER'S RECOMMENDATIONS AND SHALL BE APPROVED BY THE ENGINEER.
4. ALL SIGNS SHALL BE FURNISHED WITH TETHERS. TETHERS SHALL BE 1/8" STAINLESS STEEL AIRCRAFT CABLE WITH A FORMED EYE ON BOTH ENDS. THE TETHER SHALL BE ATTACHED TO THE SIGN AND BASE BY BEING SANDWICHED BETWEEN TWO STAINLESS STEEL FENDER WASHERS, WITH A 1/2" MINIMUM STAINLESS STEEL BOLT. THE TETHER SHALL BE OF SUFFICIENT LENGTH TO HAVE A MINIMUM OF 6" SLACK WHEN ATTACHED BETWEEN THE SIGN AND THE SIGN BASE. ALL TETHERS SHALL BE THE SAME LENGTH.
5. ALL SIGNS SHALL BE ORIENTED SUCH THAT THE LONGITUDINAL CENTERLINE OF THE SIGN IS PERPENDICULAR TO THE RESPECTIVE TAXIWAY/RUNWAY CENTERLINE, UNLESS OTHERWISE NOTED.
6. THE ACTUAL SIGN DIMENSIONS MAY VARY FROM THOSE SHOWN. THE BASE SIZE SHALL BE ADJUSTED TO MATCH THE SIGN.
7. THE CONCRETE SHALL COMPLY WITH SPECIFICATION P-610.
8. CONCRETE STEEL REINFORCEMENT SHALL BE TYPE ASTM A615 GRADE 60. ALL REINFORCEMENT SHALL HAVE A 2" MINIMUM CONCRETE COVER. REINFORCEMENTS MAY BE ADJUSTED TO MISS INTERFERENCES.
9. ALL ANCHOR BOLTS SHALL BE A-36 STEEL, HOT DIP GALVANIZED WHEN CAST INTEGRALLY WITH THE CONCRETE PAD OR STAINLESS STEEL EXPANSION ANCHORS.
10. THE BONDING CONDUCTOR AND SIGN TETHER SHALL NOT BE ATTACHED AT THE SAME ANCHOR BOLT. AN APPROVED MECHANICAL OR COMPRESSION LUG SHALL BE USED TO CONNECT THE BONDING CONDUCTOR TO THE SIGN FLANGE AND SIGN.
11. LAYOUT OF SIGN LEGENDS BY SIGN MANUFACTURER SHALL BE APPROVED BY THE ENGINEER PRIOR TO FABRICATION.
12. INSTALL SIGNS AND FOUNDATIONS LEVEL, PROVIDE GRADING AS REQUIRED. NO ADDITIONAL PAYMENT WILL BE MADE FOR SIGN GRADING.
13. BID ITEM FOR LIGHTED SIGNS SHALL INCLUDE PVC CONDUIT EXTENDED ONE FOOT BEYOND CONCRETE PAD.
14. LOCATION GIVEN FOR SIGNS DENOTES THE MIDDLE OF THE SIGN EDGE ON THE SIDE CLOSEST TO THE RUNWAY OR TAXIWAY EDGE.

AIRPORT GUIDANCE SIGNS

SIGN #	SIGN LEGEND		L-858 SIGN TYPE		MODULES	SIZE	STYLE	CIRCUIT
	FRONT	BACK	FRONT	BACK				
G-1	BLANK	G ↗	---	Y	1	1	2	1
G-2	G 4L-22R	G	L/R	L	4	1	2	1
G-3	G 4R-22L	G	L/R	L	4	1	2	1
G-4	D7↗	BLANK	Y	---	2	1	2	2
D7-1	↖D7	D8↗	Y/L	---	2	1	2	2
D7-2	D7 ↙ D ↗	BLANK	L/Y	---	3	1	2	2
D7-3	D7 4R-22L	D7	L/R	L	4	1	2	4
D7-4	↖D7 D	BLANK	Y/L	---	3	1	2	2
D8-1	D8 ↖ D ↘	BLANK	L/Y	---	3	1	2	2
D8-2	D8 4R-22L	D8	L/R	L	4	1	2	4
D8-3	D D8↗	BLANK	L/Y	---	3	1	2	2

SIGN TYPE LEGEND

Y - BLACK LEGEND ON YELLOW BACKGROUND (L-858Y DIRECTIONAL)
R - WHITE LEGEND ON RED BACKGROUND (L-858R-MANDATORY)
L - YELLOW LEGEND ON BLACK BACKGROUND (L-858L-LOCATION)
B - WHITE LEGEND ON BLACK BACKGROUND (L-858B - RDR)



NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE 69247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

ELECTRICAL DETAILS

DRAWING E251

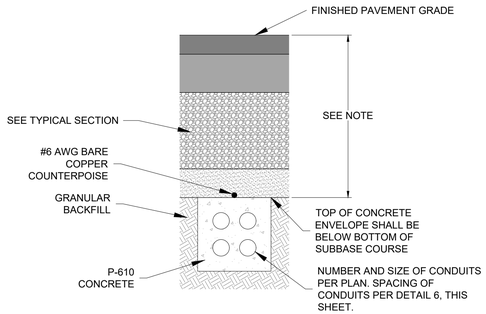
DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET 50 OF 52

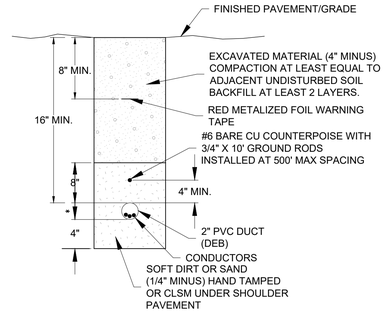
CATALOG NUMBER: A-270569

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\250-FFZ-MCTE-E250-ELEC-DET1.DWG



NOTE:
THIS DETAIL SHALL BE USED FOR ALL CONCRETE ENCASED DUCT BANKS INSTALLED UNDER NEW PAVEMENT. CONDUIT DEPTH SHALL BE DETERMINED IN FIELD.

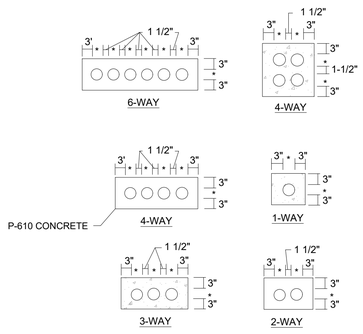
1 DUCT TRENCH (CE) DETAIL
N.T.S



NOTE:
CONDUIT SHALL BE SOFT DIRT OR SAND BACKFILL WHERE CONDUIT IS INSTALLED IN SOIL/SHOULDER. CONDUIT SHALL BE CONCRETE ENCASED UNDER FULL STRENGTH PAVEMENT.

* O.D. OF DUCT (SIZE PER BID ITEM)

2 DUCT TRENCH (DEB) DETAIL
N.T.S.



* O.D. OF DUCT (SIZE PER BID ITEM)

3 TYPICAL DUCT SPACING (CE)
N.T.S.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil) CERTIFICATE NO. 59247 JON BRYCE WEEKS 3/06/23 Date Signed ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ELECTRICAL DETAILS

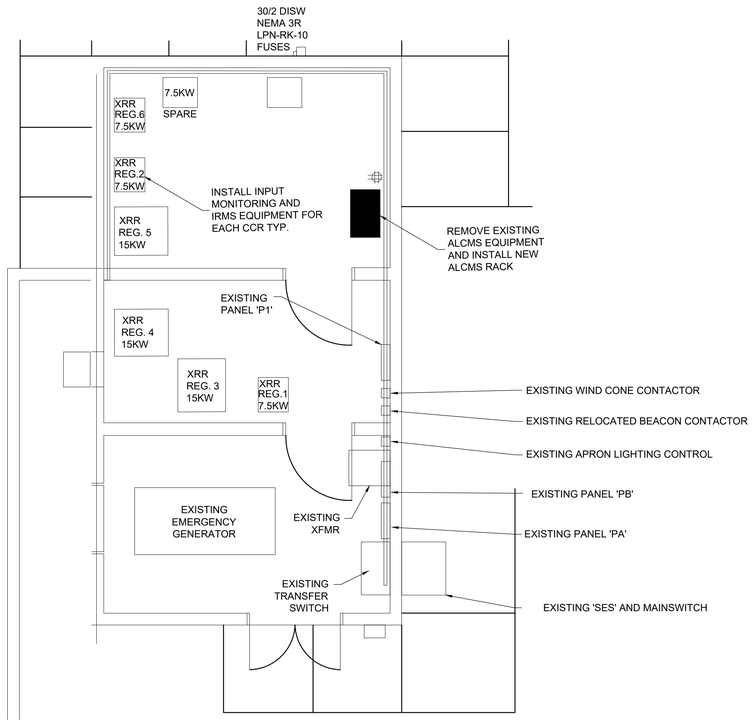
DRAWING: E252

ACTIVITY:
PROJ. NO.: CP0994

SHEET: 51 OF 52

CATALOG NUMBER: A-270570

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CADD\PLANS\250-FFZ-MCTE-E250-ELEC-DETL.DWG

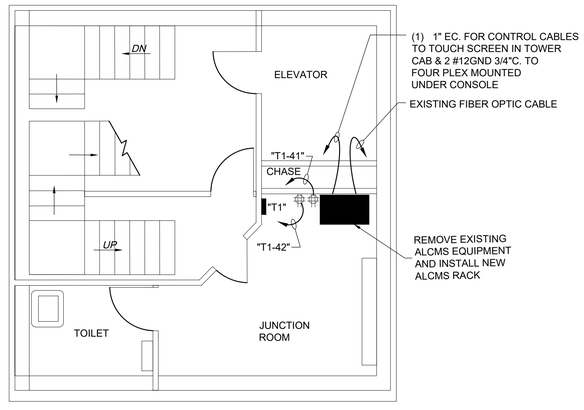


ELECTRICAL VAULT PLAN

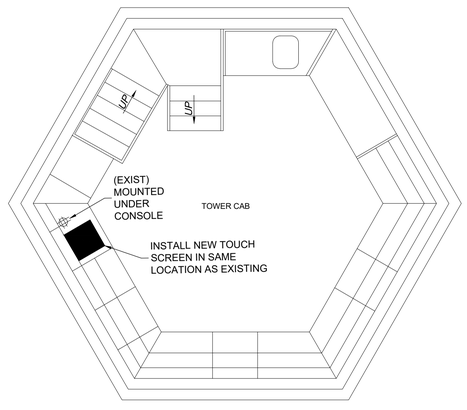
N.T.S.

NOTES:

1. NEW ALCMS SHALL CONFORM TO FAA L-890 SPECIFICATION.
2. SYSTEM SHALL BE PC BASED SYSTEM WITH TOUCH SCREEN CONTROLS.
3. CONTRACTOR SHALL INSTALL MONITORING EQUIPMENT FOR EACH CCR.
4. CONTRACTOR TO USE EXISTING FIBER NETWORK FOR COMMUNICATIONS.



5TH FLOOR



TOWER CAB

CONTROL TOWER POWER PLAN

N.T.S.

NORTH

BENCHMARK:
FFZ E (PACS)
STAINLESS STEEL ROD
ELEVATION= 1378.17

ISSUE RECORD

NO	BY		DESCRIPTION
1	J.B.W.	03/03/23	ISSUED FOR BID

Registered Professional Engineer (Civil)
CERTIFICATE
69241
JON BRYCE
WEEKS
3/06/23
Date Signed
ARIZONA, U.S.A.

CITY OF MESA
ENGINEERING DEPARTMENT

CONSTRUCT MIDFIELD CROSSOVER
TAXIWAY EAST AND REALIGNMENT OF
TAXIWAYS D7 AND D8

ELECTRICAL DETAILS

DRAWING
E253

DRAWN BY: A.P.A.
ENGINEER: J.B.W.
APPROVED BY: J.B.W.

ACTIVITY:
PROJ. NO.: CP0994

SHEET
52 OF 52

CATALOG NUMBER:
A-270571

DATE SAVED: 3/10/23 L:\FFZ\MIDFIELD CROSSOVER TAXIWAY\CAD\PLANS\250-FFZ-MCTE-E250-ELEC-DET1.DWG

SPEEDIE AND ASSOCIATES
Geotechnical • Environmental • Materials Engineers
A UES Company

www.speedie.net



REPORT ON GEOTECHNICAL INVESTIGATION

DESIGNATION: FFZ Midfield Crossover Taxiways

LOCATION: 4800 East Falcon Drive
Mesa, Arizona

CLIENT: Jviation, a Woolpert Company

PROJECT NO: 222518SA

DATE: February 24, 2023

3331 East Wood Street ■ Phoenix, AZ 85040 ■ Phone (602) 997-6391 ■ Fax (602) 943-5508
2026 North 3rd Street ■ Flagstaff, AZ 86004 ■ Phone (928) 526-6681 ■ Fax (928) 526-6685
3125 East 47th Street ■ Tucson, AZ 85713 ■ Phone (520) 514-9411 ■ Fax (520) 514-9474

SPEEDIE AND ASSOCIATES
Geotechnical • Environmental • Materials Engineers
A UES Company

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 GENERAL SITE AND SOIL CONDITIONS 3

2.1 Site Conditions & History 3
2.2 Geological Conditions 5
2.3 General Subsurface Conditions 5

3.0 ANALYSIS AND RECOMMENDATIONS 6

3.1 Analysis 6
3.2 Site Preparation 7
3.3 Fill and Backfill 9
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4.0 GENERAL 12

APPENDIX A – Field and Laboratory Data
APPENDIX B – FAARFIELD Analysis



1.0 INTRODUCTION

This report presents the results of a geotechnical investigation completed by Speedie & Associates, LLC (S&A) for the construction of the proposed new midfield crossover taxiways and realignment of the high speed connector taxiways along Runway 4R/22L at Falcon Field Airport (FFZ) in Mesa, Arizona.

We understand that taxiway improvements are required as the current connector taxiways do not meet current FAA design standards. The improvements will include two new midfield crossover taxiways (an East and West Crossover). These taxiways will likely be constructed in phases, with only one constructed at a time (starting with the Midfield East project). The Midfield West project is anticipated to occur in 1 to 2 years. As part of the addition of the new crossover taxiways, adjustments will be required for the existing high speed connector taxiways along Runway 4R/22L. This will include relocation and realignment of the high speed taxiways at Taxiways D4, D7, and D8, between Taxiway D and Runway 4R/22L.

The purpose of this investigation was to determine the existing soil conditions in order to make recommendations for the construction of the new taxiway pavement surfaces based on the anticipated traffic loads. The scope of the field work conducted and the recommendations presented in this report are based on the general guidelines presented in FAA AC No. 150/5320-6G. This assessment was limited to a visual observation of the surface conditions and a limited number of soil borings to determine the current subgrade soil profile for pavement design. A site plan showing the location of the soil borings and the approximate limits of the project is attached in Appendix A. Preliminary planning indicates that the taxiway pavements will likely be constructed with traditional asphalt concrete (AC). If desired, alternate options for Portland cement concrete pavement can also be provided. Please contact this office if PCCP sections are desired.

Falcon Field Airport accommodates a wide range of aircraft. At this time, a new comprehensive traffic analysis was not available for the project area. Jviation along with representatives of Mesa Falcon Field discussed the current and future anticipated traffic loadings on the pavement in this area based on previously available airport traffic data. At this time, it is expected the majority of the operations within the project limits will consist of light to moderately loaded general aviation and/or business type airplanes. These aircraft have typical maximum takeoff weights of 2,500 lbs to 28,000 lbs. A lower volume of slightly larger aircraft may also use the taxiway pavements, including aircraft up to 47,000 lbs. Table 1.0.1 and Table 1.0.2 present a summary of the anticipated aircraft, as provided by the client. Table 1.0.1 presents the anticipated fleet mix that will use the midfield crossover taxiways and Table 1.0.2 presents the anticipated fleet mix understand that will use the connector taxiways along Taxiway D. The traffic data as presented in the following tables and the results of the field and laboratory testing were used to evaluate the new pavement sections on this project.

Table 1.0.1 Aircraft Fleet Mix for New Crossover Taxiways

Aircraft Type	FAARFIELD Equivalent Aircraft	% Annual Growth	Maximum Take-off Weight (lbs.)	Annual Operations
Cessna 172 Skyhawk	Cessna 172 Skyhawk	0	2,650	16,876
Cessna 210 Centurion	Cessna C210 Centurion	0	4,000	1,718
Piper Malibu	PA-23-250 Aztec	0	6,000	4,569
Beechcraft F90 King Air	Beechcraft King Air C90	0	10,950	5,570
Cessna Citation CJ4	Cessna Citation VI/VII	0	17,110	2,189
Beech 200 Super King	Beechcraft King Air B200	0	12,500	2,106
Bombardier Learjet 60	D-20	0	22,750	384
Cessna Citation X	Cessna Citation X	0	36,600	721
			Total	**34,133**

Table 1.0.2 Aircraft Fleet Mix for Realignment of Taxiway D Connectors

Aircraft Type	FAARFIELD Equivalent Aircraft	% Annual Growth	Maximum Take-off Weight (lbs.)	Annual Operations
Cessna 172 Skyhawk	Cessna 172 Skyhawk	0	2,650	19,854
Cessna 210 Centurion	Cessna C210 Centurion	0	4,000	2,021
Piper Malibu	PA-23-250 Aztec	0	6,000	5,375
Beechcraft F90 King Air	Beechcraft King Air C90	0	10,950	6,552
Cessna Citation CJ4	Cessna Citation VI/VII	0	17,110	2,575
Beech 200 Super King	Beechcraft King Air B200	0	12,500	2,477
Bombardier Learjet 60	D-20	0	22,750	451
Cessna Citation X	Cessna Citation X	0	36,600	2,289
Bombardier Challenger 600/601/604	Bombardier CL-604-605	0	47,600	309
			Total	**41,903**

2.0 GENERAL SITE AND SOIL CONDITIONS

2.1 Site Conditions & History

The proposed midfield crossover taxiways are located within the infield area between Runway 4L/22R and Runway 4R/22L and will connect near the touchdown targets of Runway 4L/22R. These infield areas sit slightly lower than the surrounding pavement and are generally covered with short weeds and grasses. The Taxiway D connector taxiways are located within the low infield areas between Taxiway D and Runway 4R/22L. These areas are used for drainage and sit slightly lower than the adjacent pavement elevation. At the time of the investigation, the upper soils were slightly soft and wet due to a recent rain event. The drilling equipment left deep ruts in the surface of the infield areas. The areas around the proposed improvements consist of airport facilities, including taxiways, aprons, runways, and associated lighting utilities. The approximate locations of the soil borings are shown on the Soil Boring Location Plan in Appendix A.



Figure 2.1.1 – Site Photo



Figure 2.1.2 – Site Photo

A cursory review of historical aerials was conducted in addition to reviewing the "Work History" section of the Pavement Management report completed by ADOT for Falcon Field. Based on published data, Taxiway D was constructed around 1991 and has undergone several improvements in the years 1993, 1995, 1999, 2010, 2015, and 2022. The improvements included an AC overlay, crack sealing, slurry seal, and seal coat. Runway 4R/22L was initially constructed in 1962 and underwent a 200-foot extension in 1983. Runway 4L/22R was constructed in 1983. Both runways have undergone several improvements through the years. Thought not included within the "Work History" section of the Pavement Management Report, historical aerial photos appear to show a possible runway present at the subject site in 1949, although this was no longer visible by 1953. Refer to the following historical aerial photos for additional details and information:

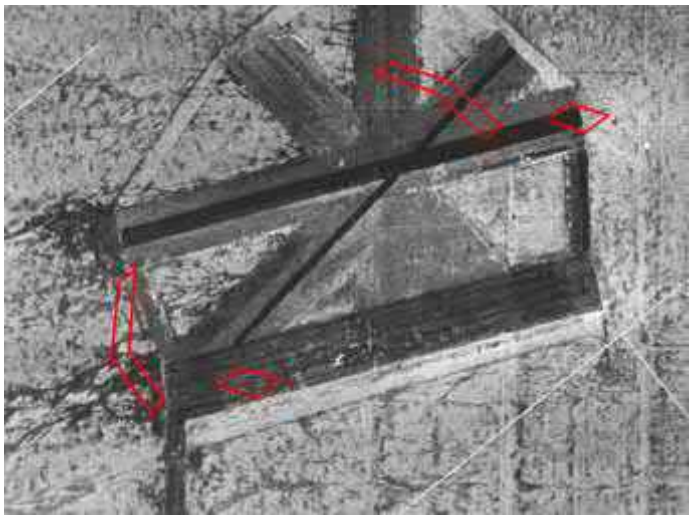


Figure 2.1.3 – Dated 1949

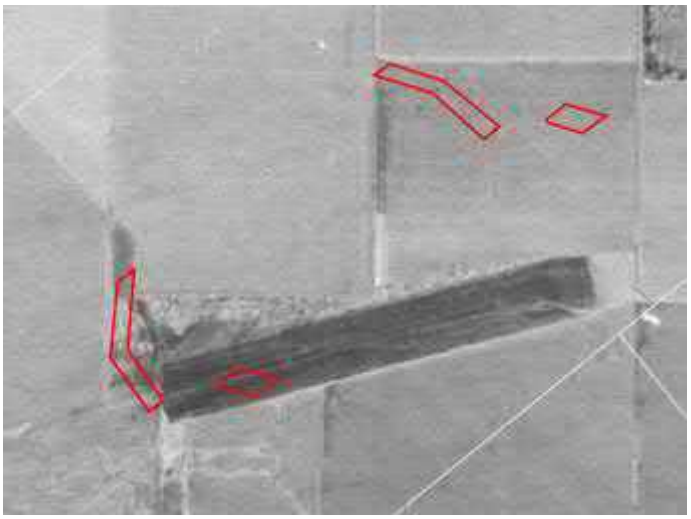


Figure 2.1.4 – Dated 1953

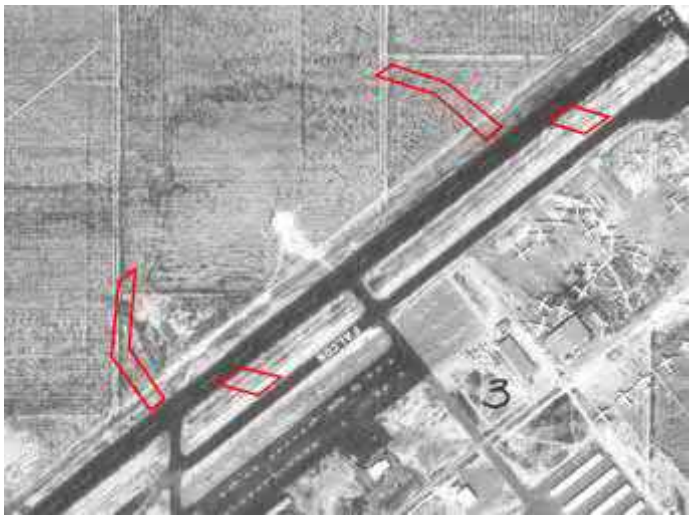


Figure 2.1.5 – Dated 1976

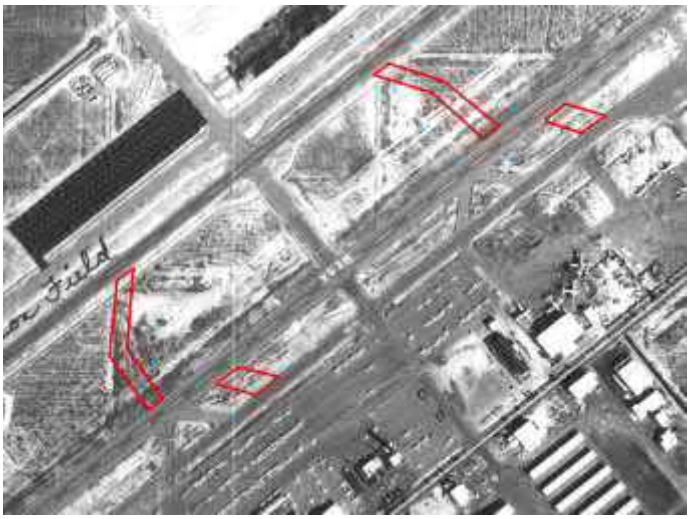


Figure 2.1.6 – Dated 1986



Figure 2.1.7 – Dated 2003

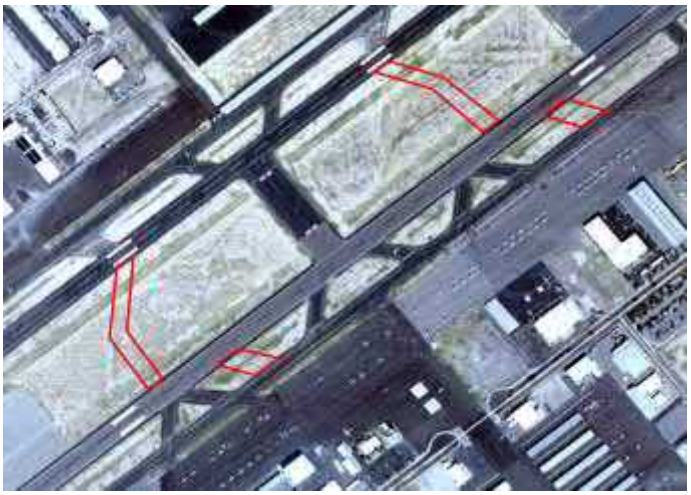


Figure 2.1.8 – Dated 2021

"Historical Aerial Photography," *ArcGIS Web Application*. [Online]. Available: https://gis.maricopa.gov [Accessed: 16-Feb-2022].

2.2 Geological Conditions

The site is **located near known areas** that have undergone considerable subsidence due to groundwater removal. Subsidence is typically a basin-wide phenomenon that would result in differential elevation changes over long distances, which would not affect the type of improvements proposed for this project. However, subsidence is also known to produce more localized areas of earth fissuring, which has had an adverse effect on areas within several miles of the site. Fissure gullies form over subsurface irregularities such as bedrock highs, which cause tensional stresses and differential subsidence. Where such anomalies are not present, subsidence tends to be uniform over a wide area, thus having minimal effect on pavements.

There are reported earth fissures located in the Mesa study area, east of the intersection of North Power Road and East University Road, approximately 4 miles southeast from the site. Based on local experience, subsidence and earth fissures historically have **not** been a problem in the subject site area, and no evidence of earth fissures was observed on the site during the fieldwork conducted for this report.

2.3 General Subsurface Conditions

A total of eight borings were drilled for this project to evaluate the subgrade properties and aid in the design of the new taxiway pavement. Four borings were advanced within the eastern portion of the airport for the midfield crossover and associated Taxiway D connectors and four borings were advanced on the west end for the future phase midfield crossover taxiway and Taxiway D connectors. The approximate locations of the borings are shown on the Soil Boring Location Plan in Appendix A.

Determination of the adjacent runway and taxiway thickness was not within our scope of work. However, it will be important when constructing the new taxiway pavement that the existing pavement structure be taken into consideration for drainage and construction considerations. If available, the existing as-built information should be reviewed before selecting the final pavement structure to ensure compatibility between the two pavement sections.

All of the borings were advanced within the unpaved infield areas. Although not indicated on the boring logs, fill is likely present along portions of the taxiway alignment as a result of the previous site uses and improvements. The subsoils soils were generally consistent between the boring locations and between the east and west ends of the project. The soil profile consisted primarily of layers of sandy lean clay and clayey sand to the maximum depth of the exploration at 11.5 feet below existing grades. Layers of silty sand and lean clay with sand were encountered in Boring B-7. Subordinate amounts of gravel and varying degrees

of calcareous cementation were also noted throughout the soil profile. Standard Penetration Resistance Test (SPT) values in the subsoils range from 7 to 50+ blows per foot (bpf), and were variable with depth. No groundwater was encountered during this investigation. Based on visual and tactile observation, the upper soils were in a 'dry' to 'dry to moist' state at the time of the investigation. It should be noted that the borings were advanced shortly after a storm event and slightly elevated moisture contents were noted in several of the borings.

Laboratory testing indicates in-situ dry densities of the upper soils range from 84.5 to 91.8 pcf with water contents ranging from 4.8 to 15.0 percent at the time of investigation. The samples that were tested contain fines (material passing the U.S. Standard #200 sieve) ranging between 33.4 and 64.4 percent with liquid limits and plasticity index values ranging between 27 to 46 percent and 10 to 23 percent, respectively. CBR values of 7 and 10.5 were obtained from combined bulk samples collected at Borings B-6, B-7, & B-8 (Comp 2) and Borings B2, B-3, & B-4 (Comp 1), respectively, when compacted to 95 percent of the **ASTM D1557 (modified proctor)** laboratory test procedure. CBR values of 15 and 14.5 (Comp 2 and Comp 1, respectively) were obtained when compacted to 100 percent. **A modified proctor was selected based on the potential for future aircraft loading of greater than 60,000 lbs**. These values were similar to what has been noted during previous investigations at FFZ. Additional discussion on the design CBR is included in the following section.

3.0 ANALYSIS AND RECOMMENDATIONS

3.1 Analysis

Analysis of the field and laboratory data indicates that the subgrade soils will be adequate for support of new taxiway pavements designed for the given airplane traffic.

The proposed improvements sit within the unpaved infield drainage areas between the taxiways and runways. As a result, some site preparation will be required with regard to infill of the low areas and changes to the drainage. The upper clayey soils can be sensitive to moisture and may be difficult to compact when at an elevated moisture content. Depending on the time of year of construction and previous rainfall activity these soils could be wet and difficult to use as compacted fill and may require time to dry out. Alternative options are provided in the Site Preparation section of this report.

The laboratory test results indicate that the foundation soils are of moderate to high plasticity, and based on previous investigations these higher plasticity soils typically has a moderate to high swell potential, which can potentially be a cause for concern at the site. While not typically a concern in pavement applications (roadways, runways, taxiways, etc.), the issue arises when cracks form in the pavement allowing

moisture to infiltrate into the subgrade. Therefore, it will be critical to provide proper drainage off the pavement as well as provide a maintenance program which will address the pavement aging process. As asphalt pavements age they become more ridged and eventually crack. These cracks provide a direct drainage path for water to reach the subgrade which will result in the weakening of the subgrade. This is especially a concern when the soils are more susceptible to moisture changes such as the more clayey material found in some of the borings.

Ground water is not expected to be a factor in the design or construction of shallow foundations and underground utilities. Excavation operations should be relatively straightforward although variable cemented soils may impede progress and possibly require the use of heavier equipment for deeper excavations.

The subsoils within the project limits generally consist of sandy lean clay or clayey sand with subordinate amounts of gravel. This material will provide adequate support for new pavements if proper earthwork techniques are used. A soaked CBR value of 7 and 10.5 was obtained from the laboratory testing when compacted to 95 percent of maximum dry density of a modified proctor (ASTM D1557). A modified proctor was selected based on the possibility that aircraft with weights greater than 60,000 lbs. may use the pavement. If a standard proctor (ASTM D698) is desired, an increased level of compaction will be recommended. Using the recommendations provided in the FAA Airport Pavement Design and Evaluation Advisory Circular No. 150/5320-6G, a design CBR value should be selected using the mean value of all tests minus one standard deviation. **A design CBR value of 8** was assigned for the determination of new structural sections where required. This value is slightly lower than what has been used on some of the other projects at FFZ. This is likely due to the higher plasticity and clay content noted at the boring locations.

It must be noted that all new asphalt pavements will eventually crack. Cracking in asphalt pavement is typical and should be expected over the life of the pavement. In fact, S&A's experience with the new asphalt binders that are available is that pavements appear to be experiencing the earlier onset of aging and thermal block shrinkage cracking. Routine maintenance is required to mitigate accelerated deterioration. Accordingly, it is highly recommended to establish a maintenance program where cracks are routinely filled as they appear beginning at about the second year of life. It is also recommended that surface fog seal coats be considered beginning at about year 5 and every 5 years after. This will help preserve the pavements, extending the service life.

3.2 Site Preparation

The entire area to be occupied by the proposed construction should be stripped of all vegetation, debris, rubble and obviously loose surface soils. Carefully remove all pavement (where needed to tie into the existing pavement) and other elements, any deleterious materials that may be encountered. If any utility is

located within 3 feet of any finished pavement grade, relocation of the utility should be provided. Old storm drains or culverts (if any) that are not part of the new construction should be removed and replaced with engineered fill.

The existing asphalt pavement to be removed may be crushed/pulverized and stockpiled for reuse on this project or elsewhere on the airport property. **If this material is intended for reuse below the new pavement as an aggregate base in the apron area, it must meet FAA specification for a P-208 Aggregate Base Course.** *This option is only feasible if the apron will be limited to aircraft of 60,000 lbs or less.* Alternatively, this material could also be used to help stabilize any soft/moist soils, if encountered within the low-lying infield areas.

It is assumed that the new taxiways will require some minor fills to bring the taxiway pavement up from the lower infield elevation. Prior to placement of fill, the exposed cohesive subgrade soils should be prepared in accordance with FAA Standard P-152. The soils should be scarified to a depth of 8 inches, moisture conditioned to optimum (3% below to 1% above) and compacted to at least 95 percent of maximum dry density as determined by **ASTM D-1557 (Modified proctor).** The scarification and compaction prior to filling will ensure that the soil compaction levels meet the requirements of FAA AC150/5370-10H.

The clayey soils are sensitive to excessive moisture content and will become unstable at elevated moisture content. Accordingly, it may be necessary to compact soils on the dry side of optimum, especially in asphalt pavement areas. The soils encountered within this investigation were generally of medium dense consistency with moisture contents below optimum moisture. Depending on the amount of rainfall prior to construction, there is a potential for increased moisture in the low-lying infield areas. If zones of unstable or soft subgrade are found during site grading, there are several options available to help stabilize these conditions.

On previous projects, contractors have crushed/pulverized the existing asphalt pavement and re-used the material for a base course or subbase. If it is available from the demolition of the existing taxiway or from previous projects, it can be re-used below the new pavement section to help stabilize and bridge the subgrade. Although, depending on the crushing method, nesting of the materials can become an issue. It will be necessary for the contractor to be able demonstrate that there is an acceptable compaction of this material as it is not possible to complete compaction testing with a sand cone or nuclear density gauge. The depth of removal and replacement will depend on the severity of the problem area. It is recommended to use at least an additional 12 inches of aggregate base to replace loose/pumping soils.

As an alternative to the re-use of crushed pavements as presented above, the unstable soils can be completely removed to a depth on the order of 1 to 2 feet below the finished subgrade; deeper excavations may be required if the loose, wet areas extend deeper. The soft/wet soils may be set aside to dry and be re-placed and re-compacted once they have dried sufficiently. Another option is to treat the exposed unstable subgrade with cement in general accordance with FAA P-301. Since this is not part of the structural section, a mix design is not required. For budgeting purposes, it is recommended to use 5 percent cement mixed into the top 12 inches of exposed subgrade then compacted per the project compaction requirements.

3.3 Fill and Backfill

It is anticipated that some minor filling or backfilling will be required to bring the lower grade of the infield areas up to the finished pavement grade. The native soils are suitable for engineered subgrade fill if required, provided the soils are properly moisture conditioned and compacted as outlined in this report. Elevated moisture contents may be encountered in the drainage areas, as a result the soils may need time to dry prior to placement as engineered fill. If imported fill for taxiway is required, it should be granular fill meeting the following gradation and plasticity requirements.

Sieve Size	Percent Passing
3 inch	100
No. 4	20-60
No. 40	10-40
No. 200	0-30

The maximum plasticity index per ASTM D4318 should not exceed 8. A higher plasticity index may be approved at the discretion of the engineer provided that the percent passing the No. 40 sieve and No. 200 sieve does not exceed 20 percent and 10 percent, respectively.

Fill should be placed on subgrade that has been properly prepared and approved by a Geotechnical Engineer. Fill must be wetted and thoroughly mixed to achieve optimum moisture content, ±2 percent, be placed in horizontal lifts of 8-inch thickness (or as dictated by compaction equipment) and be compacted to at least **95 percent** of maximum dry density per **ASTM D-1557** (Modified Proctor) as it is assumed that future aircraft loading may include aircraft greater than 60,000 lbs. If it is anticipated that the pavement will be designed for aircraft less than 60,000 lbs, then **98 percent** of **ASTM D-698** (Standard Proctor) may be used. The above selected level of compaction should be consistent for the project and includes utility trench backfill as well as general subgrade fills.

3.4 Pavement

The new pavement will accommodate a variety of General and Commercial Aviation. A comprehensive traffic analysis was not conducted for the new taxiway pavement; however, we understand that the aircraft fleet mix will be as noted in Section 1.0 of this report. The pavement sections were calculated using procedures outlined in FAA Advisory Circular AC 150/5320-6G and the FAA computer program FAARFIELD (version 2.0.18). The designs assume that the controlling subgrade will consist of the compacted native soils materials meeting the requirements presented herein.

Construction will require the removal of surface site features in entirety and other existing improvements as outlined in the Site Preparation section of this report. If unstable subgrade conditions are encountered, remove, and replace with one of the options provided in Section 3.2 Site Preparation. The pavement sections provided below assume that the subgrade has been properly prepared as set forth herein.

It is anticipated that most of the air traffic will consist of light general aviation aircraft and midsized business jets with typical maximum weights on the order of 2,600 to 12,000 lbs. In general, based on the provided traffic data, the Taxiway D connectors will experience a higher volume of air traffic, including loading from larger aircraft, such as the Cessna Citation X and Bombardier Challenger. These aircraft have weights on the order of 36,000 to 47,000 lbs. A detailed breakdown of the design aircraft fleet mix and observed number of annual operations (provided by Jviation) is summarized in Section 1.0 of this report. For this analysis no growth rate was applied to the aircraft traffic.

The following apron Hot Mix Asphalt (HMA) pavement sections were analyzed using the FAA Advisory Circular 150/5320-6G Airport Pavement Design and Evaluation, and the assumption that the controlling subgrade will consist of the compacted native soils materials meeting the requirements presented herein and the FAA specifications for subgrade preparation. The capacities were determined using the guidance presented in the Advisory Circular and with the FAA computer program FAARFIELD. **A CBR value of 8 was selected to determine the minimum flexible pavement design**. This CBR value was selected based on the laboratory test and FAA procedure for CBR selection criteria. This CBR value is based on a modified proctor and a higher level of compaction due to the potential for aircraft loading of greater than 60,000 lbs. If the taxiway pavement will be subject to only aircraft less than 60,000 lbs, a standard proctor value may be used. However, it is recommended that the level of compaction be increased to 98 percent to ensure the higher CBR value that is assumed in the design.

Note, for aircraft loading less than 60,000 lbs. it is acceptable to use FAA specification P-208 (instead of P-209), which may provide some additional cost savings. The designer/owner should choose the appropriate sections to meet the intended use. The following table presents the required pavement sections to accommodate several loading conditions with variance in frequency of operations as dictated by the FAARFIELD design program:

Table 3.4.1 – Pavement Sections for Full Depth Reconstruction

Location	Total Pavement Thickness, inches	Flexible Pavement		
		AC Thickness (P-401/403)	Aggregate Base (P-208/209) (4)	Compacted Subgrade (P-152)
Midfield Crossover Taxiways	13.0	3.0 inches	10.0 inches	8.0 inches
	12.0	4.0 inches	8.0 inches	8.0 inches
Taxiway D Connectors	14.0	3.0 inches	11.0 inches	8.0 inches
	14.0	4.0 inches	10.0 inches	8.0 inches

Notes:

1. These designs are based on FAA Advisory Circular 150/5320-6G Airport Pavement Design and Evaluation.
2. Designs are based upon the complete provided Aircraft Fleet Mix outlined in Section 1.0 of this report.
3. Sections provided represent minimum pavement sections to meet FAA specifications based on the fleet mix and subgrade conditions.
4. In accordance with FAA specifications, P-208 should only be used when the pavement will support loads less than 60,000 lbs. specifies that P-208 Aggregate Base can only be used if expected aircraft are less than 60,000 lbs.
5. A 4-inch minimum AC surface is recommended for pavements that will support aircraft loads greater than 60,000 lbs per FAA Specifications
6. For shoulder design, it is recommended to match the adjacent pavement structure to allow for positive drainage of the base.

These designs are based on materials meeting FAA Advisory Circular AC 150/5370-10H Standards for Specifying Construction of Airports. Asphaltic concrete subject to direct plane traffic should consist of FAA Specification P-401. A ½ inch or ¾ inch mix designation should be used for the pavement. While a ¾ inch mix may have a somewhat rougher texture, it offers more stability and resistance to scuffing, particularly in turning areas. The maximum aggregate size depends on installed lift thickness. Typically, the minimum lift thickness should be at least 3.0 times the maximum aggregate size with a maximum lift thickness

of 4.0 inches. The asphalt supplier should be informed of the pavement use and be required to provide a mix that will provide stability and be aesthetically acceptable. A mix design should be submitted for review to determine if it will be acceptable for the intended use.

The mix design should be based for moderate aircraft using PG 70-16 asphalt oil, as this binder is readily available and used on other state highway projects. While FAA AC 150/5370-10H generally recommends a PG grade of lower than a -22, on the low end, due to the potential for block shrinkage cracking, the PG 70-16 is locally available and used for most paving projects. Increasing the binder range to PG 70-22 will require that a polymer modified binder be used, which will result in additional construction/material costs on the project. It is our experience that having proper compaction levels and high quality materials will help reduce the potential for block shrinkage cracks. If budgets allows it, consideration could be given to increasing to the binder range to PG 70-22 to aid in block cracking reduction. Pavement installation should be completed under applicable portions of FAA standards. The asphalt supplier should be informed of the pavement use and be required to provide a mix that will provide stability and be aesthetically acceptable.

4.0 GENERAL

The scope of this investigation and report includes only regional published considerations for seismic activity and ground fissures resulting from subsidence due to groundwater withdrawal, not any site-specific studies. The scope does not include any considerations of hazardous releases or toxic contamination of any type.

Our analysis of data and the recommendations presented herein assume that soil conditions do not vary significantly from those found at specific sample locations. Our work has been performed in accordance with generally accepted engineering principles and practice; this warranty is in lieu of all other warranties expressed or implied.

We recommend that a representative of the Geotechnical Engineer observe and test the earthwork and foundation portions of this project to ensure compliance to project specifications and the field applicability of subsurface conditions which are the basis of the recommendations presented in this report. If any significant changes are made in the scope of work or type of construction that was assumed in this report, we must review such revised conditions to confirm our findings if the conclusions and recommendations presented herein are to apply.

Respectfully submitted,
SPEEDIE & ASSOCIATES, LLC



Nicholas J. Vitale, P.E.



Todd B. Hanke, P.E.

SPEEDIE AND ASSOCIATES
Geotechnical • Environmental • Materials Engineers
A UES Company

APPENDIX A

FIELD AND LABORATORY INVESTIGATION

SOIL BORING LOCATION PLAN

SOIL LEGEND

LOG OF TEST BORINGS

TABULATION OF TEST DATA

MOISTURE-DENSITY RELATIONS

CBR TEST DATA

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FIELD AND LABORATORY INVESTIGATION

On January 12, 2023, soil test borings were drilled, and cores were taken at the approximate locations shown on the attached Soil Boring Location Plan. All exploration work was carried out under the full-time supervision of our field engineer, who recorded subsurface conditions and obtained samples for laboratory testing. The soil borings were advanced with a truck-mounted CME-75 drill rig utilizing 7-inch diameter hollow stem flight augers. Detailed information regarding the borings and samples obtained can be found on an individual Log of Test Boring prepared for each drilling location.

Laboratory testing consisted of moisture content, dry density, grain-size distribution, plasticity (Atterberg Limits) and CBR tests for classification and pavement design parameters. All field and laboratory data is presented in this appendix.



- APPROXIMATE SOIL BORING LOCATIONS

SOIL BORING LOCATION PLAN

SHEET: 1 OF 1 | DR: RB | REV: | DATE: 12/13/22 | PROJECT NO.: 222518SA

FFZ MIDFIELD CORSSOVER TAXIWAY
4800 EAST FALCON DRIVE
MESA, ARIZONA

SPEEDIE AND ASSOCIATES
GEOTECHNICAL ▪ ENVIROMENTAL ▪ MATERIALS ENGINEERS

SOIL LEGEND

SAMPLE DESIGNATION		DESCRIPTION	
	AS	**Auger Sample**	A grab sample taken directly from auger flights.
	BS	**Large Bulk Sample**	A grab sample taken from auger spoils or from bucket of backhoe.
	S	**Spoon Sample**	Standard Penetration Test (ASTM D-1586) Driving a 2.0 inch outside diameter split spoon sampler into undisturbed soil for three successive 6-inch increments by means of a 140 lb. weight free falling through a distance of 30 inches. The cumulative number of blows for the final 12 inches of penetration is the Standard Penetration Resistance.
	RS	**Ring Sample**	Driving a 3.0 inch outside diameter spoon equipped with a series of 2.42-inch inside diameter, 1-inch long brass rings, into undisturbed soil for one 12-inch increment by the same means of the Spoon Sample. The blows required for the 12 inches of penetration are recorded.
	LS	**Liner Sample**	Standard Penetration Test driving a 2.0-inch outside diameter split spoon equipped with two 3-inch long, 3/8-inch inside diameter brass liners, separated by a 1-inch long spacer, into undisturbed soil by the same means of the Spoon Sample.
	ST	**Shelby Tube**	A 3.0-inch outside diameter thin-walled tube continuously pushed into the undisturbed soil by a rapid motion, without impact or twisting (ASTM D-1587).
	--	**Continuous Penetration Resistance**	Driving a 2.0-inch outside diameter "Bullnose Penetrometer" continuously into undisturbed soil by the same means of the spoon sample. The blows for each successive 12-inch increment are recorded.

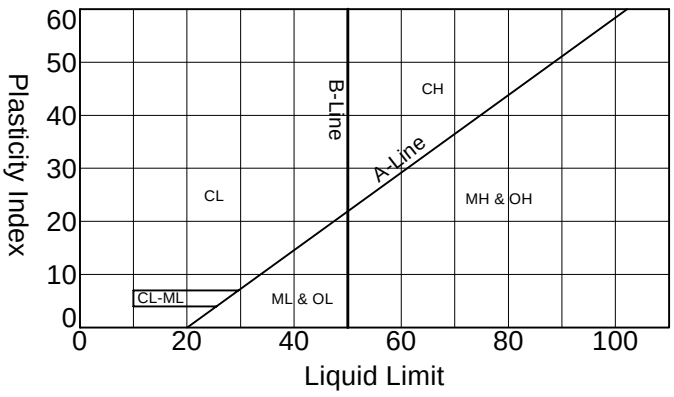
CONSISTENCY			RELATIVE DENSITY	
Clays & Silts	Blows/Foot	Strength (tons/sq ft)	Sands & Gravels	Blows/Foot
Very Soft	0 - 2	0 - 0.25	Very Loose	0 - 4
Soft	2 - 4	0.25 - 0.5	Loose	5 - 10
Firm	5 - 8	0.5 - 1.0	Medium Dense	11 - 30
Stiff	9 - 15	1 - 2	Dense	31 - 50
Very Stiff	16 - 30	2 - 4	Very Dense	> 50
Hard	> 30	> 4		

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		**GW**	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		**GM**	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		**SW**	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		**SM**	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		**ML**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				**PT**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL OR MODIFIED SYMBOLS MAY BE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS OR TO PROVIDE A BETTER GRAPHICAL PRESENTATION OF THE SOIL

MATERIAL SIZE	PARTICLE SIZE			
	Lower Limit		Upper Limit	
	mm	Sieve Size ◆	mm	Sieve Size ◆
SANDS				
Fine	0.075	#200	0.42	#40
Medium	0.420	#40	2.00	#10
Coarse	2.000	#10	4.75	#4
GRAVELS				
Fine	4.75	#4	19	0.75" ×
Coarse	19	0.75" ×	75	3" ×
COBBLES	75	3" ×	300	12" ×
BOULDERS	300	12" ×	900	36" ×

◆U.S. Standard ×Clear Square Openings



Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	Very Stiff Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation					
	Whitish Brown	S-1	2.5	NT	NT	
5	5.0					
	Medium Dense Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel	RS-2	6.0	9.1	84.5	
10						
	11.5 End of Boring	S-3	11.5	NT	NT	
15						

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-1**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	Stiff Brown SANDY LEAN CLAY (CL-Moist) with Trace Gravel, Weak Calcareous Cementation					
	Light Brown to Brown	S-1	2.5	NT	NT	
5.0		BS-2	5.0	NT	NT	
5	Dense Whitish Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel	S-3	6.5	NT	NT	
10	Medium Dense, Light Brown					
11.5		S-4	11.5	NT	NT	
	End of Boring					
15						

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-2**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	Medium Dense Light Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel	RS-1	2.0	4.8	87.2	
5	Whitish Brown, Weak Calcareous Cementation	BS-2	5.0	NT	NT	
		S-3	6.5	NT	NT	
10	Dense, Light Brown to Brown					
	11.5 End of Boring	S-4	11.5	NT	NT	
15						

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-3**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 25 50)
0	Medium Dense Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel					
	Whitish Brown	S-1	2.5	NT	NT	
5	Dense, Weak Calcareous Cementation	BS-2	5.0	NT	NT	
		S-3	6.5	NT	NT	
10	Medium Dense, Light Brown					
	11.5 End of Boring	S-4	11.5	NT	NT	
15						

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-4**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 / 25 / 50)
0	Hard Light Brown to Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel	RS-1	2.0	15.0	91.8	
3.0						
	Medium Dense Light Brown to Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation	S-2	6.5	NT	NT	
5						
10	Very Dense					
11.5	End of Boring	S-3	11.5	NT	NT	75/12"
15						

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-5**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
0	Very Stiff Brown to Light Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel					
	Whitish Brown, Weak Calcareous Cementation	S-1	2.5	NT	NT	
5	5.0	BS-2	5.0	NT	NT	
	Medium Dense Light Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel	S-3	6.5	NT	NT	
	8.0					
10	Hard Light Brown SANDY LEAN CLAY (CL-Dry to Moist) with Moderate Calcareous Cementation	S-4	10.8	NT	NT	50/3"
	11.5 End of Boring					
15						

Penetration Resistance Blows per Foot: 0, 25, 50

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-6**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 / 25 / 50)
0	Very Stiff Whitish Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel	S-1	2.5	NT	NT	
5	5.0	BS-2	5.0	NT	NT	
	Medium Dense Brown SILTY SAND (SM-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation	S-3	6.5	NT	NT	
	7.0					
	Hard Light Brown LEAN CLAY with SAND (CL-Dry to Moist) with Weak Calcareous Cementation					
10	Moderate Calcareous Cementation	S-4	10.5	NT	NT	50/6"
	10.5 End of Boring					
15						

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-7**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

Rig Type: **CME-75**
Boring Type: **Hollow Stem Auger**
Surface Elevation: **N/A**

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot
0	Very Stiff Brown SANDY LEAN CLAY (CL-Dry to Moist) with Trace Gravel, Weak Calcareous Cementation					
	Whitish Brown	S-1	2.5	NT	NT	
5	5.0	BS-2	5.0	NT	NT	
	Hard Brown CLAYEY SAND (SC-Dry to Moist) with Trace Gravel	RS-3	6.0	8.7	84.8	
	7.0					
	Hard SANDY LEAN CLAY (CL-Dry to Moist) with Weak Calcareous Cementation					
10						
	11.5 End of Boring	S-4	11.5	NT	NT	74/12"
15						

Penetration Resistance Blows per Foot: 0, 25, 50

Boring Date: **1-12-23**
Field Engineer/Technician: **R. Bainum**
Driller: **F. Esparza**
Contractor: **Resilient Drilling**

Water Level

Depth	Hour	Date
Free Water was Not Encountered		

NT = Not Tested

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: **B-8**

Falcon Field Taxiways

4800 East Falcon Drive

Mesa, Arizona

Project No.: **222518SA**

_SPEEDIE 222518SA.GPJ GENGEO.GDT 2/8/23

TABULATION OF TEST DATA

SOIL BORING or TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE INTERVAL (ft)	NATURAL WATER CONTENT (Percent of Dry Weight)	IN-PLACE DRY DENSITY (Pounds Per Cubic Foot)	PARTICLE SIZE DISTRIBUTION (Percent Finer)					ATTERBERG LIMITS			UNIFIED SOIL CLASSIFICATION	SPECIMEN DESCRIPTION
						#200 SIEVE	#40 SIEVE	#10 SIEVE	#4 SIEVE	3" SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
B-1	RS-2	RING	5.0 - 6.0	9.1	84.5	33.4	52	85	95	100	46	23	23	SC	CLAYEY SAND
B-2	BS-2	BULK	0.0 - 5.0	NT	NT	57.6	72	87	96	100	38	19	19	CL	SANDY LEAN CLAY
B-3	RS-1	RING	1.0 - 2.0	4.8	87.2	46.1	70	88	96	100	27	16	11	SC	CLAYEY SAND
B-4	BS-2	BULK	0.0 - 5.0	NT	NT	48.5	68	87	97	100	28	18	10	SC	CLAYEY SAND
B-5	RS-1	RING	1.0 - 2.0	15.0	91.8	64.4	78	91	97	100	45	23	22	CL	SANDY LEAN CLAY
B-6	BS-2	BULK	0.0 - 5.0	NT	NT	58.3	73	89	97	100	32	21	11	CL	SANDY LEAN CLAY
B-7	BS-2	BULK	0.0 - 5.0	NT	NT	55.3	73	88	96	100	32	20	12	CL	SANDY LEAN CLAY
B-8	RS-3	RING	5.0 - 6.0	8.7	84.8	40.4	58	79	91	100	42	25	17	SC	CLAYEY SAND

Sieve analysis results do not include material greater than 3". Refer to the actual boring logs for the possibility of cobble and boulder sized materials.

NT=Not Tested

Falcon Field Taxiways
4800 East Falcon Drive
Mesa, Arizona
Project No. 222518SA

SPEEDIE AND ASSOCIATES

TABULATION OF TEST DATA 222518SA.GPJ GENGEO.GDT 2/8/23

MOISTURE-DENSITY RELATIONS

PROJECT: Falcon Field Taxiways **PROJECT NO.: 222518SA**

LOCATION: 4800 East Falcon Drive **DATE: 1/12/23**

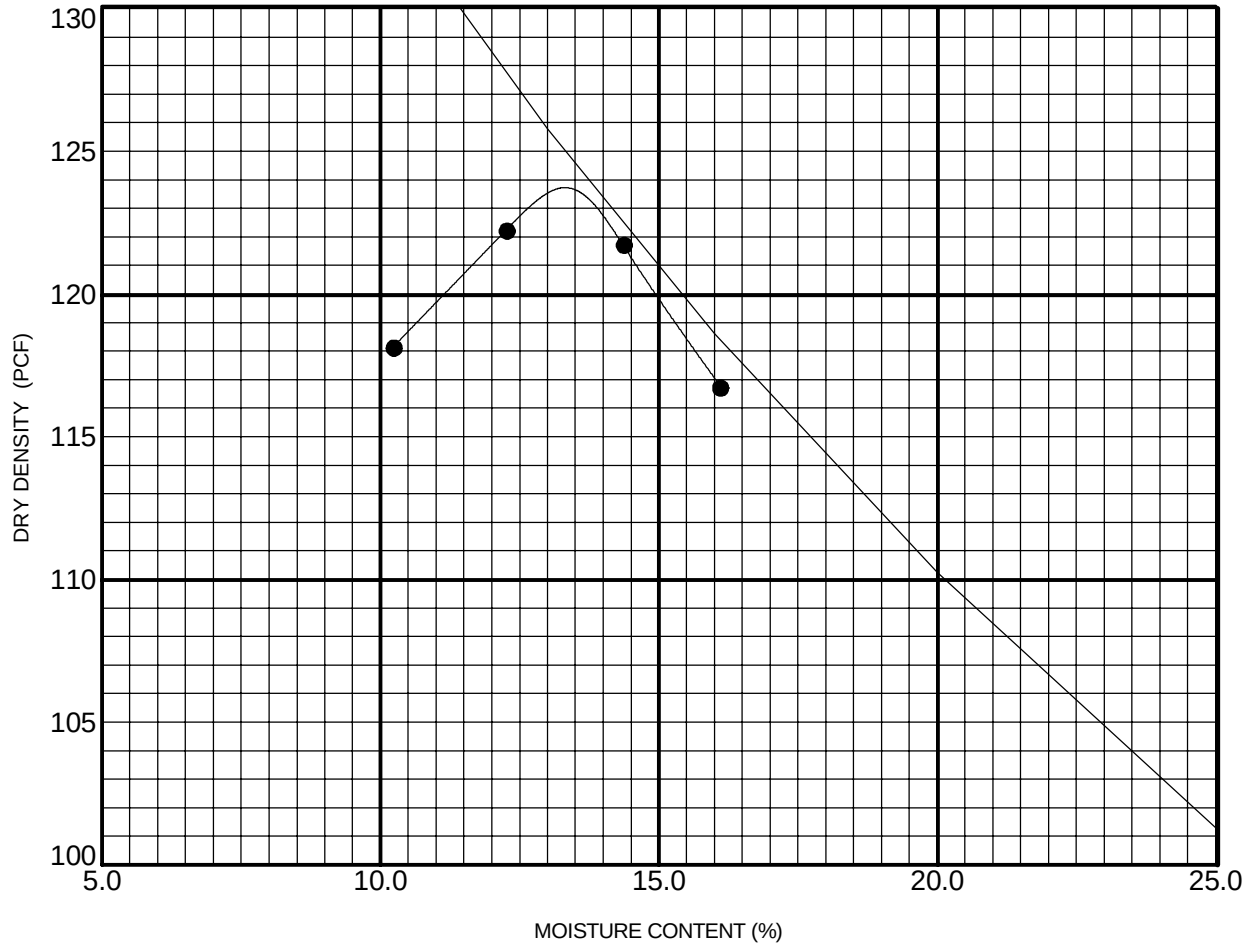
BORING NO.: COMP-1 **SAMPLE NO.: BS-1** **SAMPLE DEPTH: 0 to 5** **LABORATORY NO.:**

METHOD OF COMPACTION: D698A

LIQUID LIMIT: **PLASTIC LIMIT:** **PLASTICITY INDEX:**

CLASSIFICATION: **ASTM SOIL DESCRIPTION:**

MAXIMUM DRY DENSITY: **123.9 PCF** OPTIMUM MOISTURE CONTENT: **13.3%**



SPEEDIE AND ASSOCIATES

GEOTECH PROCTOR 222518SA.GPJ 2/8/23

MOISTURE-DENSITY RELATIONS

PROJECT: Falcon Field Taxiways **PROJECT NO.: 222518SA**

LOCATION: 4800 East Falcon Drive **DATE: 1/12/23**

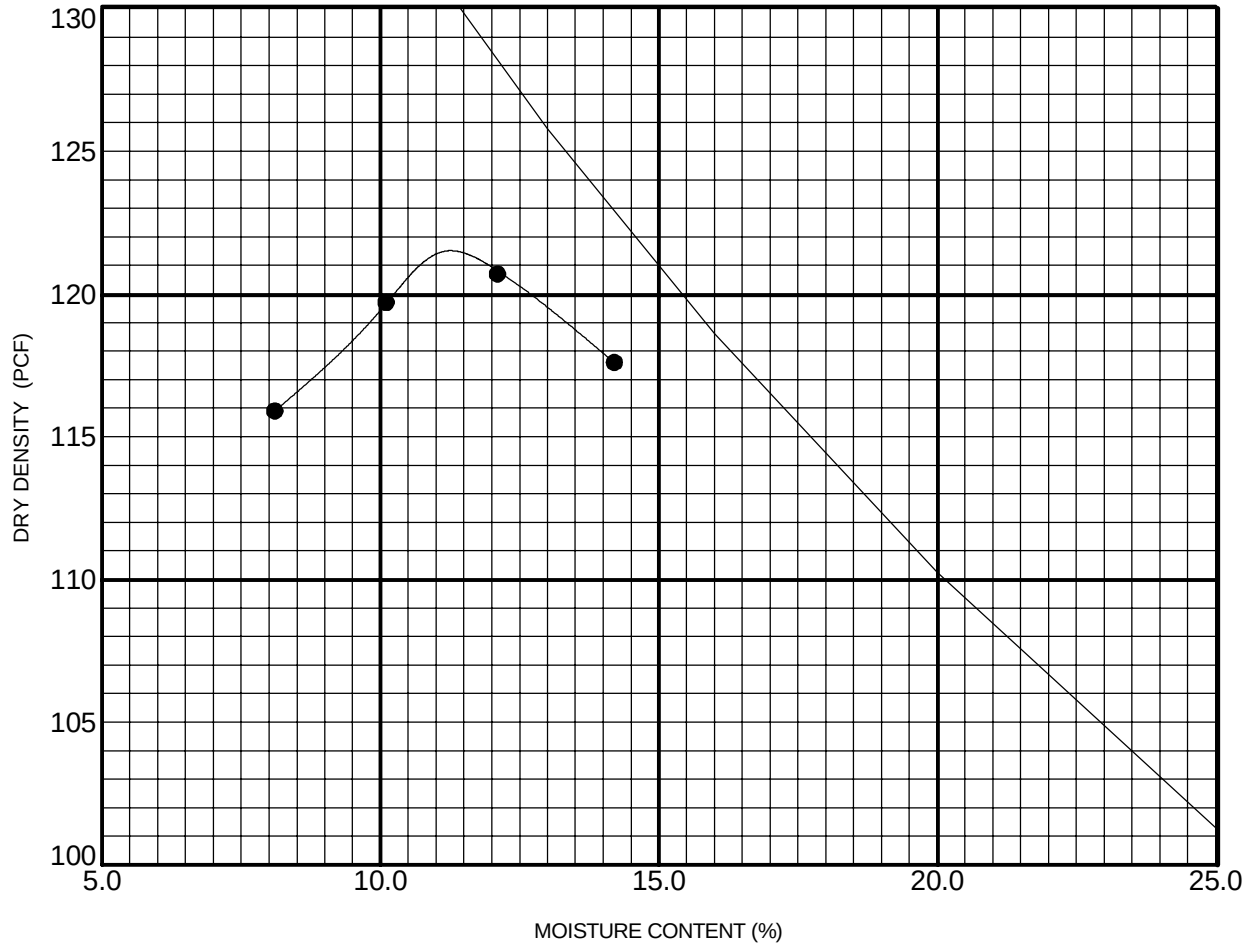
BORING NO.: COMP-2 **SAMPLE NO.: BS-1** **SAMPLE DEPTH: 0 to 5** **LABORATORY NO.:**

METHOD OF COMPACTION: **D698A**

LIQUID LIMIT: **PLASTIC LIMIT:** **PLASTICITY INDEX:**

CLASSIFICATION: **ASTM SOIL DESCRIPTION:**

MAXIMUM DRY DENSITY: **121.5 PCF** OPTIMUM MOISTURE CONTENT: **11.2%**



SPEEDIE AND ASSOCIATES

GEOTECH PROCTOR 222518SA.GPJ 2/8/23

SPEEDIE AND ASSOCIATES
Geotechnical ▪ Environmental ▪ Materials Engineers
3331 E. WOOD ST., PHOENIX, AZ 85040 ■ O: 602-997-6391 F: 602-943-5508

C.B.R. (AASHTO T-193)

CLIENT: **Jviation**
Jon Weeks
900 South Broadway, Suite 350
Denver, CO 80209

PROJECT NO: **222518SA**
LAB NO: **FTG39**
DATE: **2/7/2023**

PROJECT: **FFZ Midfield Crossover Taxiways**
LOCATION: **4800 East Falcon Drive**
SAMPLE ID: **Comp 1**

PENETRATION (inches)	10 BLOWS Load (lbs.)	10 BLOWS STRESS (psi)	30 BLOWS Load (lbs.)	30 BLOWS STRESS (psi)	65 BLOWS Load (lbs.)	65 BLOWS STRESS (psi)
0.000	0	0.0	0	0.0	0	0.0
0.025	39	13.0	65	21.7	60	20.1
0.050	70	23.4	143	47.7	124	41.4
0.075	115	38.3	215	71.7	240	79.9
0.100	147	49.0	275	91.7	353	117.6
0.125	188	62.7	330	110.0	440	146.7
0.150	227	75.7	379	126.4	506	168.6
0.175	265	88.3	421	140.3	561	187.0
0.200	301	100.3	457	152.3	609	203.1
0.300	432	144.0	582	194.1	776	258.8
0.400	555	185.1	694	231.5	926	308.6
0.500	661	220.4	789	263.1	1052	350.8

	DD - BT	DD - AT	% MOIST. BT	% MOIST. AT	TOP 1" % MOIST.	AVE % MOIST - AS	% SWELL	CORR. C.B.R.
10 BL.	116.3	113.8	11.3	16.1	16.2	16.1	0.6	6.7
30 BL.	117.3	117.3	13.7	14.8	16.1	15.4	0.5	10.2
65 BL.	124.0	124.3	13.9	14.0	15.2	14.6	0.3	14.7

MAXIMUM DRY DENSITY (ASTM D1557) = 123.9 pcf
OPTIMUM MOISTURE CONTENT = 13.3 %

CORRECTED FINAL C.B.R. @ 100 % COMPACTION = 14.5

CORRECTED FINAL C.B.R. @ 95 % COMPACTION = 10.5

Laboratory test results reported herein apply only to the specific sample on which the test was run. SA warrants that this work was performed under the appropriate standard of care, including the skill and judgement that is reasonably expected from similarly situated professionals. No other warranty, guaranty, or representation, either express or implied is included or intended.

Reviewed by *B. Wong*

SPEEDIE AND ASSOCIATES
Geotechnical ▪ Environmental ▪ Materials Engineers
3331 E. WOOD ST., PHOENIX, AZ 85040 ■ O: 602-997-6391 F: 602-943-5508

C.B.R. (AASHTO T-193)

CLIENT: **Jviation**
Jon Weeks
900 South Broadway, Suite 350
Denver, CO 80209

PROJECT NO: **222518SA**
LAB NO: **FTG44**
DATE: **2/7/2023**

PROJECT: **FFZ Midfield Crossover Taxiways**
LOCATION: **4800 East Falcon Drive**
SAMPLE ID: **Comp 2**

PENETRATION (inches)	10 BLOWS Load (lbs.)	10 BLOWS STRESS (psi)	30 BLOWS Load (lbs.)	30 BLOWS STRESS (psi)	65 BLOWS Load (lbs.)	65 BLOWS STRESS (psi)
0.000	0	0.0	0	0.0	0	0.0
0.025	32	10.6	49	16.4	23	7.7
0.050	56	18.8	93	31.2	63	21.0
0.075	77	25.5	148	49.2	146	48.5
0.100	90	30.1	207	69.0	240	79.9
0.125	101	33.7	249	83.0	337	112.4
0.150	112	37.4	284	94.7	426	142.2
0.175	128	42.6	314	104.7	504	167.9
0.200	140	46.8	345	114.9	570	189.9
0.300	186	62.0	476	158.7	779	259.6
0.400	234	77.9	613	204.4	959	319.7
0.500	289	96.2	753	250.9	1130	376.6

	DD - BT	DD - AT	% MOIST. BT	% MOIST. AT	TOP 1" % MOIST.	AVE % MOIST - AS	% SWELL	CORR. C.B.R.
10 BL.	106.4	105.5	11.2	19.6	22.5	21.1	1.9	3.1
30 BL.	115.8	114.2	10.5	15.0	19.9	17.4	1.6	7.7
65 BL.	122.0	121.5	10.7	13.3	12.6	13.0	0.7	16.0

MAXIMUM DRY DENSITY (ASTM D1557) = 121.5 pcf
OPTIMUM MOISTURE CONTENT = 11.2 %

CORRECTED FINAL C.B.R. @ 100 % COMPACTION = 15.0

CORRECTED FINAL C.B.R. @ 95 % COMPACTION = 7.0

Laboratory test results reported herein apply only to the specific sample on which the test was run. SA warrants that this work was performed under the appropriate standard of care, including the skill and judgement that is reasonably expected from similarly situated professionals. No other warranty, guaranty, or representation, either express or implied is included or intended.

Reviewed by *B. Wong*

SPEEDIE AND ASSOCIATES
Geotechnical • Environmental • Materials Engineers
A UES Company

APPENDIX B

FAARFIELD ANALYSIS

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 222518SA FFZ Crossover Taxiways

Section: Midfield Option 1

Analysis Type: HMA on Aggregate

Last Run: Life/Compaction Analysis 2023-02-24 11:24:50

Calculated Life = 20.0 Years

Total thickness to the top of the subgrade = 12.5in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	3.0	200,000	0.35	0
2	P-209 Crushed Aggregate	9.5	39,697	0.35	0
3	Subgrade	0	12,000	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	Cessna 172 Skyhawk	2,650	16,876	0
2	Cessna C210 Centurion	4,000	1,718	0
3	PA-23-250 Aztec	6,000	4,569	0
4	Beechcraft King Air C90	10,950	5,570	0
5	Cessna Citation VI/VII	17,110	2,189	0
6	Beechcraft King Air B200	12,500	2,106	0
7	D-20	22,750	384	0
8	Cessna Citation X	36,600	721	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	Cessna 172 Skyhawk	0.00	0.00	4.6
2	Cessna C210 Centurion	0.00	0.00	4.29
3	PA-23-250 Aztec	0.00	0.00	4.08
4	Beechcraft King Air C90	0.00	0.00	3.8
5	Cessna Citation VI/VII	0.00	0.00	2.9
6	Beechcraft King Air B200	0.00	0.00	2.74
7	D-20	0.00	0.00	2.52
8	Cessna Citation X	1.00	1.00	2.6

Subgrade Compaction Requirements

NonCohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
100	0 - 15	0 - 2	Cessna Citation X
95	15 - 27	2 - 14	Cessna Citation X
90	27 - 40	14 - 28	Cessna Citation X
85	40 - 57	28 - 45	Cessna Citation X

Cohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
95	0 - 14	0 - 1	Cessna Citation X
90	14 - 22	1 - 9	Cessna Citation X
85	22 - 30	9 - 18	Cessna Citation X
80	30 - 40	18 - 27	Cessna Citation X

Subgrade Compaction Notes:

1. Noncohesive soils, for the purpose of determining compaction control, are those with a plasticity index (PI) less than 3.

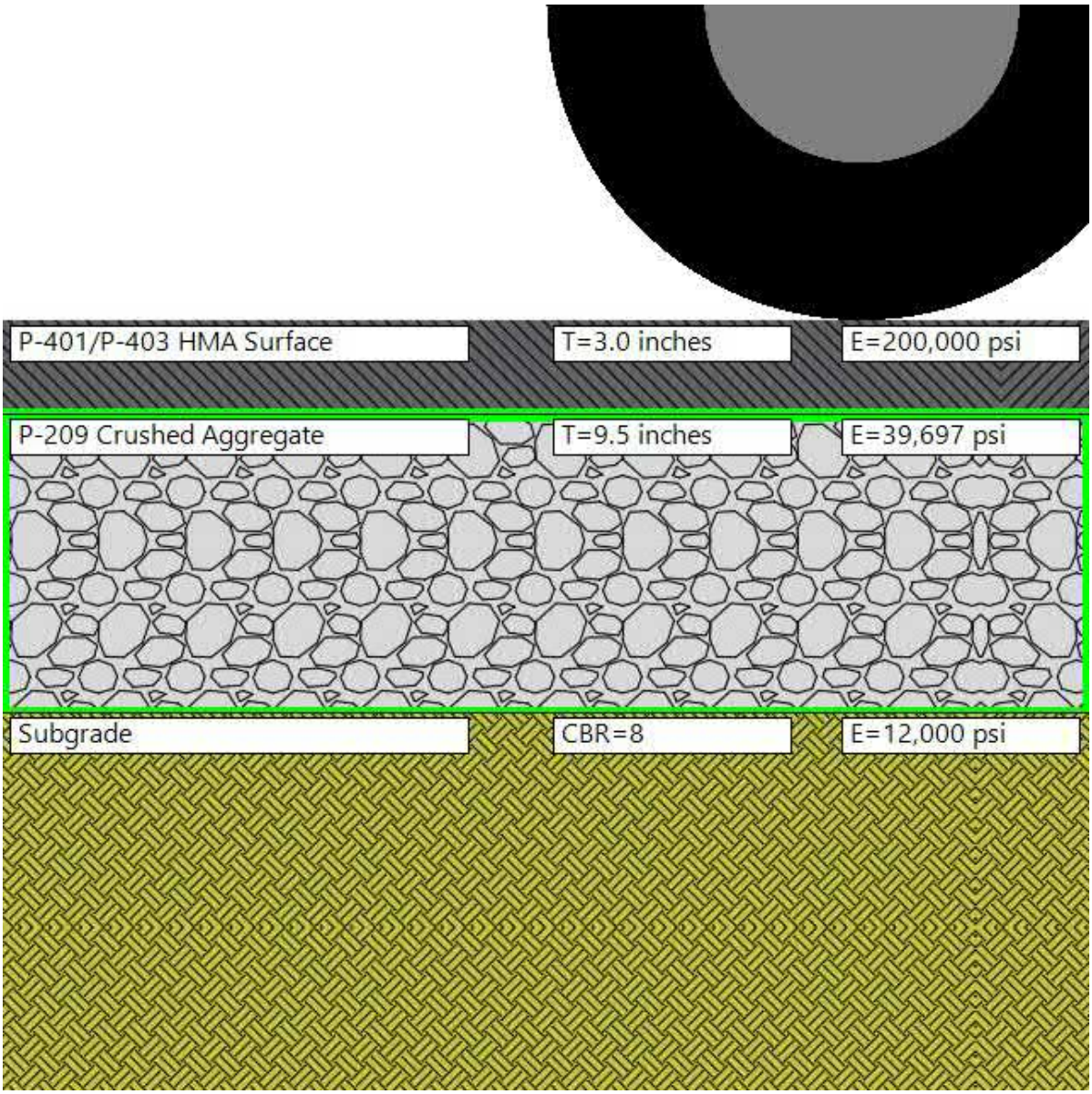
2. Tabulated values indicate depth ranges within which densities should equal or exceed the indicated percentage of the maximum dry density as specified in item P-152.

3. Maximum dry density is determined using ASTM Method D 698.

4. The subgrade in cut areas should have natural densities shown or should (a) be compacted from the surface to achieve the required densities, (b) be removed and replaced at the densities shown, or (c) when economics and grades permit, be covered with sufficient select or subbase material so that the uncompacted subgrade is at a depth where the in-place densities are satisfactory.

5. For swelling soils refer to AC 150/5320-6F paragraph 3.10.

User Is responsible For checking frost protection requirements.



Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 222518SA FFZ Crossover Taxiways

Section: Midfield Option 2

Analysis Type: HMA on Aggregate

Last Run: Life/Compaction Analysis 2023-02-24 11:26:48

Calculated Life = 20.0 Years

Total thickness to the top of the subgrade = 12.0in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	4.0	200,000	0.35	0
2	P-209 Crushed Aggregate	8.0	37,627	0.35	0
3	Subgrade	0	12,000	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	Cessna 172 Skyhawk	2,650	16,876	0
2	Cessna C210 Centurion	4,000	1,718	0
3	PA-23-250 Aztec	6,000	4,569	0
4	Beechcraft King Air C90	10,950	5,570	0
5	Cessna Citation VI/VII	17,110	2,189	0
6	Beechcraft King Air B200	12,500	2,106	0
7	D-20	22,750	384	0
8	Cessna Citation X	36,600	721	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	Cessna 172 Skyhawk	0.00	0.00	4.72
2	Cessna C210 Centurion	0.00	0.00	4.4
3	PA-23-250 Aztec	0.00	0.00	4.18
4	Beechcraft King Air C90	0.00	0.00	3.89
5	Cessna Citation VI/VII	0.00	0.00	2.95
6	Beechcraft King Air B200	0.00	0.00	2.78
7	D-20	0.00	0.00	2.55
8	Cessna Citation X	1.00	1.00	2.64

Subgrade Compaction Requirements

NonCohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
100	0 - 14	0 - 2	Cessna Citation X
95	14 - 26	2 - 14	Cessna Citation X
90	26 - 40	14 - 28	Cessna Citation X
85	40 - 57	28 - 45	Cessna Citation X

Cohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
95	0 - 13	0 - 1	Cessna Citation X
90	13 - 22	1 - 10	Cessna Citation X
85	22 - 30	10 - 18	Cessna Citation X
80	30 - 40	18 - 28	Cessna Citation X

Subgrade Compaction Notes:

1. Noncohesive soils, for the purpose of determining compaction control, are those with a plasticity index (PI) less than 3.

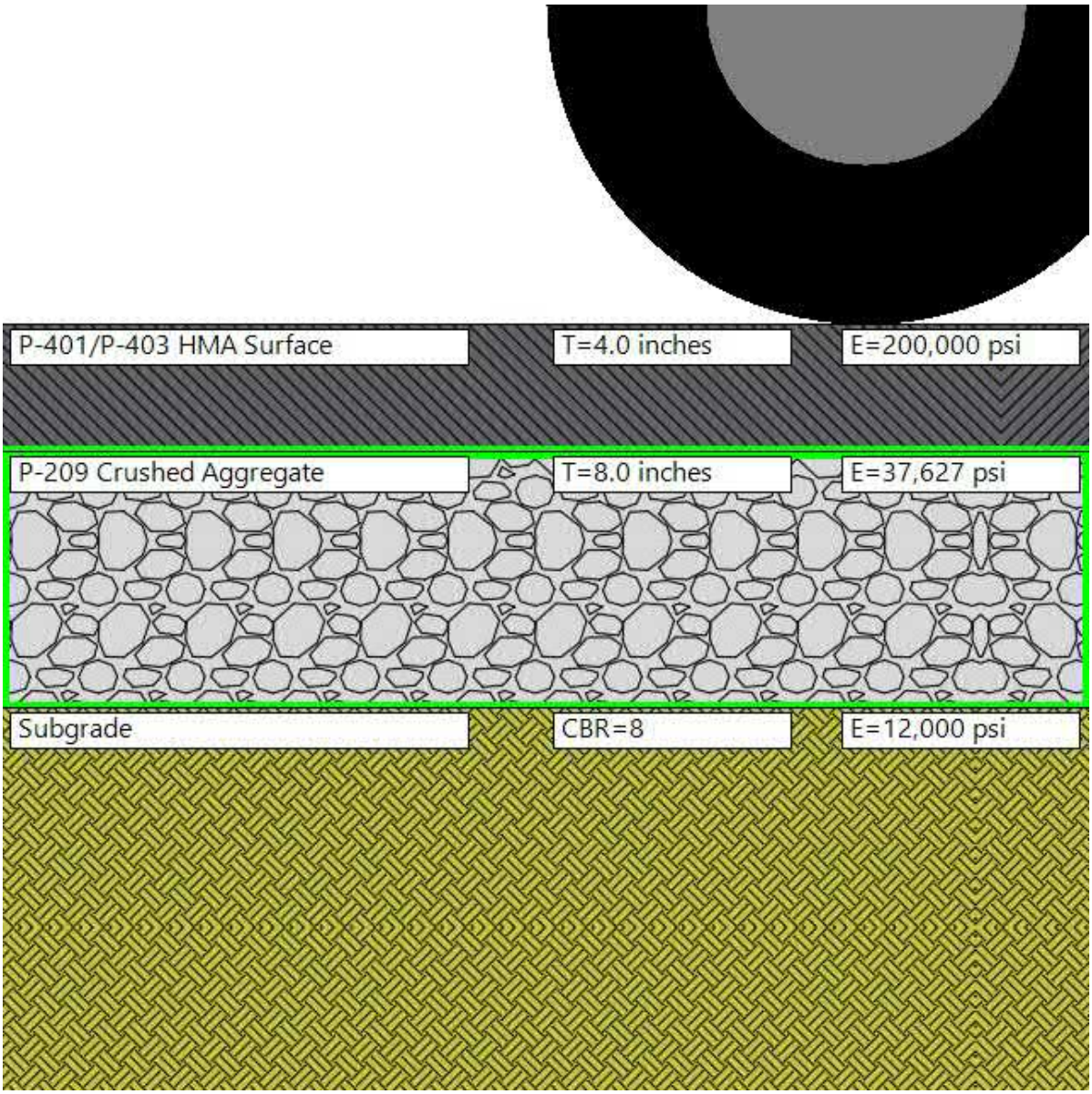
2. Tabulated values indicate depth ranges within which densities should equal or exceed the indicated percentage of the maximum dry density as specified in item P-152.

3. Maximum dry density is determined using ASTM Method D 698.

4. The subgrade in cut areas should have natural densities shown or should (a) be compacted from the surface to achieve the required densities, (b) be removed and replaced at the densities shown, or (c) when economics and grades permit, be covered with sufficient select or subbase material so that the uncompacted subgrade is at a depth where the in-place densities are satisfactory.

5. For swelling soils refer to AC 150/5320-6F paragraph 3.10.

User Is responsible For checking frost protection requirements.



Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 222518SA FFZ Crossover Taxiways

Section: Taxiway D Connector Option 1

Analysis Type: HMA on Aggregate

Last Run: Life/Compaction Analysis 2023-02-24 11:27:56

Calculated Life = 20.0 Years

Total thickness to the top of the subgrade = 13.6in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	3.0	200,000	0.35	0
2	P-209 Crushed Aggregate	10.6	41,111	0.35	0
3	Subgrade	0	12,000	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	Cessna 172 Skyhawk	2,650	19,854	0
2	Cessna C210 Centurion	4,000	2,021	0
3	PA-23-250 Aztec	6,000	5,375	0
4	Beechcraft King Air C90	10,950	6,552	0
5	Cessna Citation VI/VII	17,110	2,575	0
6	Beechcraft King Air B200	12,500	2,477	0
7	D-20	22,750	451	0
8	Cessna Citation X	36,600	2,289	0
9	Bombardier CL-604/605	47,600	309	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	Cessna 172 Skyhawk	0.00	0.00	4.31
2	Cessna C210 Centurion	0.00	0.00	4.04
3	PA-23-250 Aztec	0.00	0.00	3.86
4	Beechcraft King Air C90	0.00	0.00	3.61
5	Cessna Citation VI/VII	0.00	0.00	2.79
6	Beechcraft King Air B200	0.00	0.00	2.65
7	D-20	0.00	0.00	2.44
8	Cessna Citation X	0.56	0.56	2.52
9	Bombardier CL-604/605	0.43	0.43	2.22

Subgrade Compaction Requirements

NonCohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
100	0 - 16	0 - 3	Bombardier CL-604/605
95	16 - 30	3 - 17	Bombardier CL-604/605
90	30 - 46	17 - 33	Bombardier CL-604/605
85	46 - 65	33 - 52	Bombardier CL-604/605

Cohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
95	0 - 15	0 - 2	Bombardier CL-604/605
90	15 - 25	2 - 11	Bombardier CL-604/605
85	25 - 35	11 - 21	Bombardier CL-604/605
80	35 - 45	21 - 32	Bombardier CL-604/605

Subgrade Compaction Notes:

1. Noncohesive soils, for the purpose of determining compaction control, are those with a plasticity index (PI) less than 3.

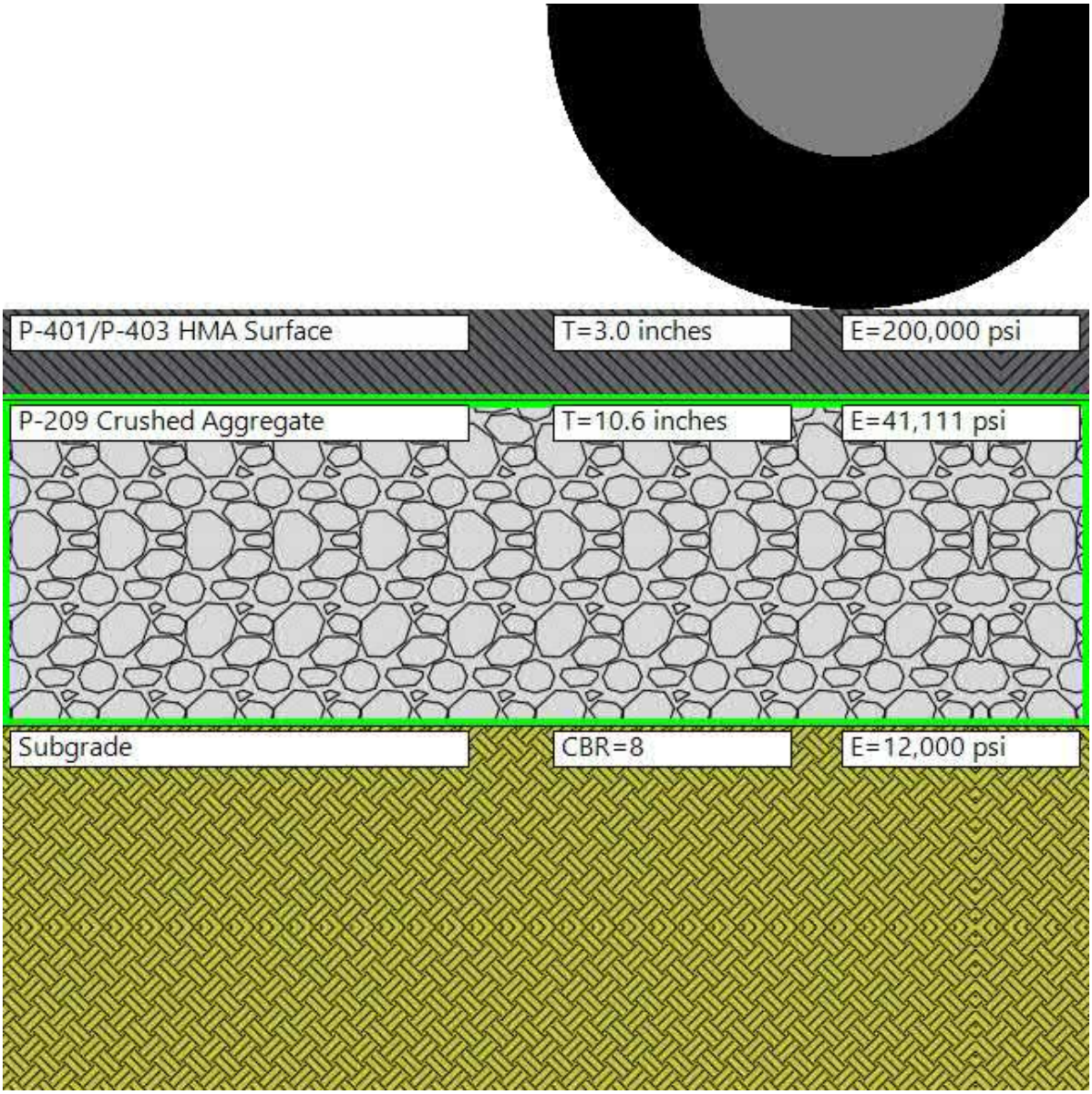
2. Tabulated values indicate depth ranges within which densities should equal or exceed the indicated percentage of the maximum dry density as specified in item P-152.

3. Maximum dry density is determined using ASTM Method D 698.

4. The subgrade in cut areas should have natural densities shown or should (a) be compacted from the surface to achieve the required densities, (b) be removed and replaced at the densities shown, or (c) when economics and grades permit, be covered with sufficient select or subbase material so that the uncompacted subgrade is at a depth where the in-place densities are satisfactory.

5. For swelling soils refer to AC 150/5320-6F paragraph 3.10.

User Is responsible For checking frost protection requirements.



Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.18 (Build 05/26/2022)

Job Name: 222518SA FFZ Crossover Taxiways

Section: Taxiway D Connector Option 2

Analysis Type: HMA on Aggregate

Last Run: Life/Compaction Analysis 2023-02-24 11:29:05

Calculated Life = 20.0 Years

Total thickness to the top of the subgrade = 13.2in.

Pavement Structure Information by Layer

No.	Type	Thickness (in.)	Modulus (psi)	Poisson's Ratio	Strength R (psi)
1	P-401/P-403 HMA Surface	4.0	200,000	0.35	0
2	P-208 Crushed Aggregate	9.2	39,359	0.35	0
3	Subgrade	0	12,000	0.35	0

Airplane Information

No.	Name	Gross Wt. (lbs)	Annual Departures	% Annual Growth
1	Cessna 172 Skyhawk	2,650	19,854	0
2	Cessna C210 Centurion	4,000	2,021	0
3	PA-23-250 Aztec	6,000	5,375	0
4	Beechcraft King Air C90	10,950	6,552	0
5	Cessna Citation VI/VII	17,110	2,575	0
6	Beechcraft King Air B200	12,500	2,477	0
7	D-20	22,750	451	0
8	Cessna Citation X	36,600	2,289	0
9	Bombardier CL-604/605	47,600	309	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	Cessna 172 Skyhawk	0.00	0.00	4.41
2	Cessna C210 Centurion	0.00	0.00	4.12
3	PA-23-250 Aztec	0.00	0.00	3.93
4	Beechcraft King Air C90	0.00	0.00	3.67
5	Cessna Citation VI/VII	0.00	0.00	2.83
6	Beechcraft King Air B200	0.00	0.00	2.68
7	D-20	0.00	0.00	2.46
8	Cessna Citation X	0.55	0.55	2.55
9	Bombardier CL-604/605	0.45	0.45	2.24

Subgrade Compaction Requirements

NonCohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
100	0 - 16	0 - 3	Bombardier CL-604/605
95	16 - 30	3 - 17	Bombardier CL-604/605
90	30 - 46	17 - 33	Bombardier CL-604/605
85	46 - 65	33 - 52	Bombardier CL-604/605

Cohesive Soil

Percent Maximum Dry Density(%)	Depth of compaction from pavement surface (in.)	Depth of compaction from top of subgrade (in.)	Critical Airplane for Compaction
95	0 - 15	0 - 2	Bombardier CL-604/605
90	15 - 25	2 - 11	Bombardier CL-604/605
85	25 - 35	11 - 21	Bombardier CL-604/605
80	35 - 45	21 - 32	Bombardier CL-604/605

Subgrade Compaction Notes:

1. Noncohesive soils, for the purpose of determining compaction control, are those with a plasticity index (PI) less than 3.

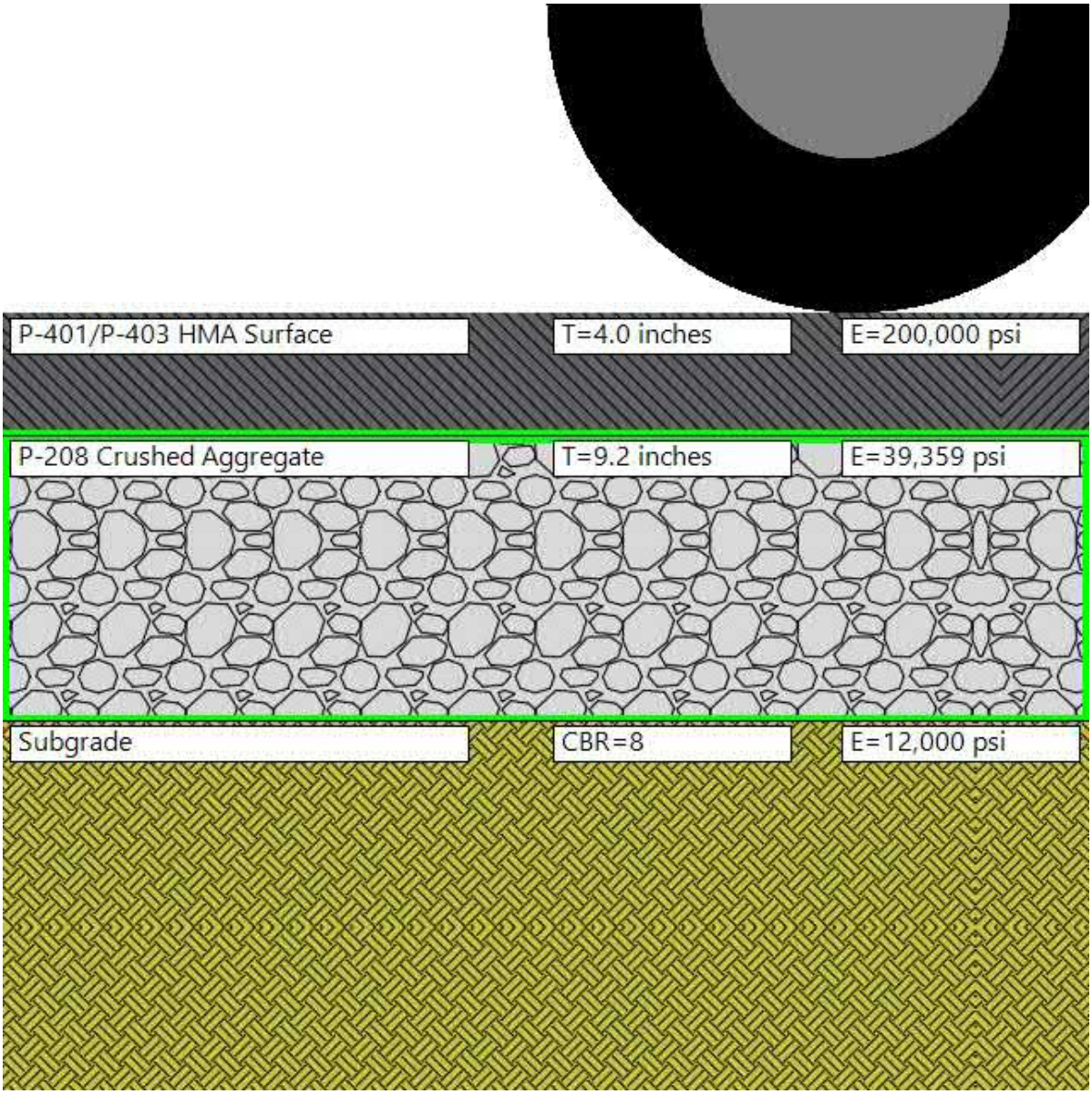
2. Tabulated values indicate depth ranges within which densities should equal or exceed the indicated percentage of the maximum dry density as specified in item P-152.

3. Maximum dry density is determined using ASTM Method D 698.

4. The subgrade in cut areas should have natural densities shown or should (a) be compacted from the surface to achieve the required densities, (b) be removed and replaced at the densities shown, or (c) when economics and grades permit, be covered with sufficient select or subbase material so that the uncompacted subgrade is at a depth where the in-place densities are satisfactory.

5. For swelling soils refer to AC 150/5320-6F paragraph 3.10.

User Is responsible For checking frost protection requirements.



DRAINAGE REPORT

CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8

Schedule I
Realignment of Taxiways D7 and D8

Schedule II
Construct Midfield Crossover Taxiway East

Schedule III
Install Airfield Lighting Control and Monitoring System (ALCMS)

AIP Project No. 3-04-0023-035-2023
City of Mesa Design Project No. CP0994East

FALCON FIELD AIRPORT

Mesa, Arizona



mesa·az
FALCON FIELD AIRPORT

Sponsored By:

Federal Aviation Administration
Arizona Department of Transportation
City of Mesa

Issued for Bid
March 3, 2023

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APPENDIX A

Vicinity Map
Flood Insurance Rate Map

APPENDIX B

Drainage Basins from Drainage Report Mesa-Falcon Field Airport Realign and Construct Taxiways A & C. May 2015

APPENDIX C

Runoff Coefficient Table Data
NOAA Precipitation Data Information
K_b Equation Parameters Table
Existing Rational and Combine Method Calculations
Proposed Rational and Combined Method Calculations

APPENDIX D

Culvert Calculations
Riprap Calculations

APPENDIX E

Existing Drainage Maps
Proposed Drainage Maps

I. GENERAL LOCATION AND DESCRIPTION

A. Project Location

This project is located within the airfield at Falcon Field Airport in Mesa, Arizona. The project consists of the removal and realignment of Taxiways D7 and D8, and construction of a new taxiway between Runways 4L-22R and 4R-22L. For the location of the project limits within the airport property limits see the Vicinity Map in Appendix A.

B. Description of Property

The project site conveys the surface runoff from the northeast to the southwest through sheet flow, existing swales, and existing storm sewer culverts, which are in the infields between the Runways and Taxiways. The surface gradient of the swales, and existing culverts is approximately 0.4%. All drainage patterns within the project limits will maintain the existing flow patterns and will convey the flows from the project site into the existing storm water system.

The Airport is located within a FEMA Flood Zone X flood hazard zone. A FEMA Zone X flood hazard zone has been determined of 0.2% annual chance of flood; areas of 1% annual chance flood with an average depth of 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance of flood. The Flood Insurance Rate Map (FIRM) for this project is provided in Appendix A.

II. MAJOR DRAINAGE BASINS AND SUB-BASINS

A. Major-Basin Descriptions

This project lays within Major Basins RL, RO, and RP as shown in the Developed Conditions Drainage Map from the Drainage Report Mesa-Falcon Field Airport Realign and Construct Taxiways A & C, May 2015 (Reference 3). The Developed Conditions Drainage Map has been included in Appendix B

Major Basin RL is located south of Runway 4L/22R, north of Runway 4R/22L, northeast of Taxiway B, and southwest of Taxiway C. For the proposed and existing drainage maps see Appendix E.

Major Basin RL is divided into three sub-basins with this project, which are RL-1, RL-2, and RL-3. The three sub-basin we created based on the location of proposed Taxiway G between Runways 4L/22R and 4R/22L. The drainage patterns for this major basin flows from northeast to southwest in the airfield away from the airfield pavement by sheet flow, storm sewers, and swales.

Major Basin RO is located south of Runway 4R/22L, north of Taxiway D southwest of Taxiway D10, and northeast of Taxiway D9. This basin will not be modified with this project but will convey the runoff into Mayor Basin RR which contains a portion of this project site. The drainage patterns for this major basin flow from northeast to southwest in the airfield away from the airfield pavement by sheet flow, swales, and culverts to Major Basin RP.

Major Basins RP and RR are located south of Runway 4R/22L, north of Taxiway D, northeast of Taxiway D6, and southwest of Taxiway D9. These two existing major basins will be divided into three sub-basins, RP-1, RP-2, and RP-3, due to the realignment of Taxiways D7, and D8. The drainage patterns for these sub-basin flow from northeast to southwest in the airfield away from the airfield pavement by sheet flow, swales, and culverts to Major Basin RS.

The sub basins are written in more detail in section II major drainage basins and sub-basins, part B Sub-Basin Description of this report.

B. Sub-Basin Description

For the 5-year, 10-year and 100-year flows for the sub-basins described below, see Proposed Rational and Combined Method Calculations in Appendix C. For the proposed drainage map showing the sub-basins described below, see Appendix E.

Sub-basin RL-1 is approximately 16.19 acres with a 5-year composite value of 0.58. The runoff of this sub-basin sheet flows into an existing swale, which is then conveyed to a proposed culvert at concentration point RL-1. Three 23”x14” concrete elliptical pipes at concentration point RL-1 conveys runoff underneath proposed Taxiway G. From the proposed culvert outfall, the runoff is conveyed to sub-basin RL-3.

Sub-basin RL-2 is approximately 2.00 acres with a 5-year composite value of 0.52. The runoff of this sub-basin sheet flows into a proposed swale, which is then conveyed to a proposed culvert at concentration point RL-2. One 23”x14” concrete elliptical pipe at concentration point RL-2 conveys runoff underneath proposed Taxiway G. From the proposed culvert outfall, the runoff is conveyed to sub-basin RL-3.

Sub-basin RL-3 is approximately 16.39 acres with a 5-year composite value of 0.47. This sub-basin collects the surface runoff from sub-basins RL-1 and RL-2 as well as the runoff from this sub-basin to concentration point RL-3. The runoff is conveyed by sheet flow and proposed and existing swales into the existing storm sewer pipes which convey the runoff under Taxiway B and into existing Major Basin RM.

Basin RO is approximately 3.42 acres with a 5-year composite value of 0.58. This basin is upstream of the project site and conveys surface runoff into the project area. Surface runoff of this basin sheet flows into an existing swale and is convey to concentration point RO. At Concentration point RO, the flows are conveyed into sub basin RP-1 by an existing culvert underneath Taxiway D9.

Sub-basin RP-1 is approximately 3.33 acres with a 5-year composite value of 0.57. This sub-basin collects the surface runoff from sub-basin RO as well as the runoff from this sub-basin to concentration point RP-1. The runoff is conveyed by sheet flow and a proposed swale to concentration point RP-1. Two 23”x14” concrete elliptical pipes at concentration point RP-1 conveys runoff underneath proposed Taxiway D8 and into sub-basin RP-2.

Sub-basin RP-2 is approximately 2.73 acres with a 5-year composite value of 0.60. This sub-basin collects the surface runoff from sub-basins RO and RP-1 as well as the runoff from this sub-basin to concentration point RP-2. The runoff is conveyed by sheet flow and a proposed swale to concentration point RP-2. Two 23"x14" concrete elliptical pipes at concentration point RP-2 conveys runoff underneath proposed Taxiway D7 and into sub-basin RP-3.

Sub-basin RP-3 is approximately 4.35 acres with a 5-year composite value of 0.61. This sub-basin collects the surface runoff from sub-basins RO, RP-1, and RP-3 as well as the runoff from this sub-basin to concentration point RP-3. The runoff is conveyed by sheet flow and proposed and existing swales into the existing storm sewer pipes which convey the runoff under Taxiway D6 and into existing Major Basin RS.

III. DRAINAGE DESIGN CRITERIA

A. Regulations

The design of drainage improvements included in this project at Falcon Field Airport follow the Drainage Policies and Standards for Maricopa County, Arizona, revised August 22, 2018 (Reference 1), Drainage Design Manual for Maricopa County, Arizona, February 10, 2011 (Reference 2), and Drainage Design Manual for Maricopa County - Hydraulics, Arizona, August 15, 2013(Reference 4). When specific design guidelines were used in the form of figures or graphs, they have been referenced.

B. Development Criteria References and Constraints

The Drainage Report Mesa-Falcon Field Airport Realign and Construct Taxiways A & C, May 2015 (Reference 3) was used to determine the basin designations, and upstream flows that will impact this project.

C. Hydrologic Criteria

Basin runoff coefficients were derived from Table 3.2 of Drainage Design Manual for Maricopa County, Arizona as they were more in line with the land types within the project area. The C_5 runoff coefficient was derived using the average value between the minimum and maximum value listed in Table 3.2 for the 2-10 Year runoff coefficient column. The C_{10} runoff coefficient utilized the maximum value listed in Table 3.2 for the 2-10 Year runoff coefficient column and the C_{100} runoff coefficient utilized the maximum value listed in the 100 Year runoff coefficient column.

The rainfall precipitation data was taken from NOAA Atlas 14, Volume 1, Version 5, website. The equation parameters for estimating K_b values were obtained from Table 3.1 of the K_b values were obtained from of Drainage Design Manual for Maricopa County, Arizona. For the composite, rainfall precipitation data, and the K_b values and equations see Appendix C.

The outfall riprap was design using equations in the Riprap Apron section of the Design Manual for Maricopa County - Hydraulics, Arizona. For riprap calculations see Appendix D

The Rational Method and the Combined Watershed method from Drainage Design Manual for Maricopa County, Arizona was used to calculate the runoff flows from the project site for the 5-year, 10-year, and 100-year.

Existing major basin RL and proposed sub-basin RL-3 are the same location that conveys flows to the existing drainage system. These two concertation points were compared and analyzed with this project. This portion of the project installs new asphalt pavement taxiway between the two existing runways. The analysis indicates that the increase in imperviousness to this basin is offset by the increase in time of concentration resulting in no increase to the existing flowrate at the existing outfall location.

Existing major basin RR and proposed sub-basin RP-3 are the same location that conveys flows to the existing drainage system. These two concertation points were compared and analyzed with this project. This portion of the project consists of removing and relocating two taxiway connectors, which did not increase overall imperviousness of the combined basins resulting in no increase to the existing flowrate at the existing outfall location.

See table 1 for comparison flows at the existing outfall locations of this project.

Table 1 Comparing Existing and Proposed Flows at project site outfalls

Concentration Points	Combined Method 5-Year (cfs)	Combined Method 10-Year(cfs)	Combined Method 100-Year (cfs)
RL	37.0	51.7	110.6
RL-3	36.2	51.4	110.5
RR	16.4	22.9	47.3
RP-3	16.1	22.8	46.8

D. Hydraulic Criteria

The culverts were analyzed using FHWA HY-8 Culvert Analysis Program. The manning's n value that was used for the culvert sizing 0.013. The proposed culverts were designed to convey the 5-year and 10-year storm events through the proposed pipes. The 5-year storm flows through the culverts with exception to the culvert in sub-basin RL-1. Culvert in sub-basin RL-1 is slightly pressurized but still conveys the flow through the pipe without overtopping the airfield pavement. During the 10-year storm event, the upstream entrance to the culverts surcharges the pipes but do not overtop the pavement except at Sub-basin RL-1. During the 100-year storm event, the runoff overtops the pavement, except at Sub-basins RL-2 and RP-1 and continues to flow downstream in swales without any basin transfer.

Sub-basin RL-1 culvert consists of three 23"x14" concrete elliptical pipes, which conveys the 5-year storm event within the storm sewer pipes. The 10-year storm event is a pressurized flow condition and slightly overtops the airfield pavement where the runoff continues downstream in a swale into the drainage system. The 100-year storm event overtops the airfield continues downstream in a swale into the drainage system.

Sub-Basin RL-2 culvert consists of one 23”x14” concrete elliptical pipe which conveys the 5-year and 10-year storm event within the storm sewer pipe. The 100-year storm event slightly surcharges the culvert but does not overtop the airfield pavement.

Sub-basin RP-1 culvert consists of two 23”x14” concrete elliptical pipes which conveys the 5-year and 10-year storm events. The 100-year storm event is slightly pressurized but does not overtop the airfield pavement and will be conveyed through the proposed pipe. The 100-year storm event overtops the airfield continues downstream in a swale into the drainage system.

Basin RP-2 culvert. consists of two 23”x14” concrete elliptical pipes which conveys the 5-year storm event within the storm sewer pipes. The 10-year storm event is a pressurized flow condition and does not overtop the airfield pavement. The 100-year storm event overtops the airfield continues downstream in a swale into the drainage system.

For the culvert calculations see Appendix D.

IV. DRAINAGE FACILITY DESIGN

A. General Concept

This project will not result in revising downstream drainage infrastructure including a detention pond.

V. CONCLUSION

A. Compliance with Standards

This drainage report has been prepared in compliance with all design criteria outlined in the Drainage Policies and Standards for Maricopa County, Arizona. (Revised August 22, 2018). Drainage Design Manual for Maricopa County, Arizona. (February 10, 2011). This report and all accompanying support calculations are intended to demonstrate that the proposed drainage design is effective and economical for controlling damage due to storm runoff, minimizing erosion and downstream damage.

B. Drainage Concept

A thorough analysis of the proposed project was performed. In general, the drainage storm sewer system is adequately sized to convey the 5-year and 10-year storm events. In most cases, the 10-year event will run pressurized through the pipes. In most cases, the 100-year storm event does overtop the airfield pavement back into the downstream swale into the drainage system.

Major basin RL has a slight increase of pavement imperviousness, but the grading of the swales causes a slight increase in time of concentration as well, which produce a flow rate that matches the existing drainage conditions at the downstream outfall location. The construction activities in major basin RP consists of realigning two taxiway connectors, which did not increase basin imperviousness values and did not produce an increase in flow rate to the downstream outfall location. This project does not increase the developed flows, the drainage patterns remain the same, and does not adversely affect downstream storm sewer infrastructure including the detention pond.

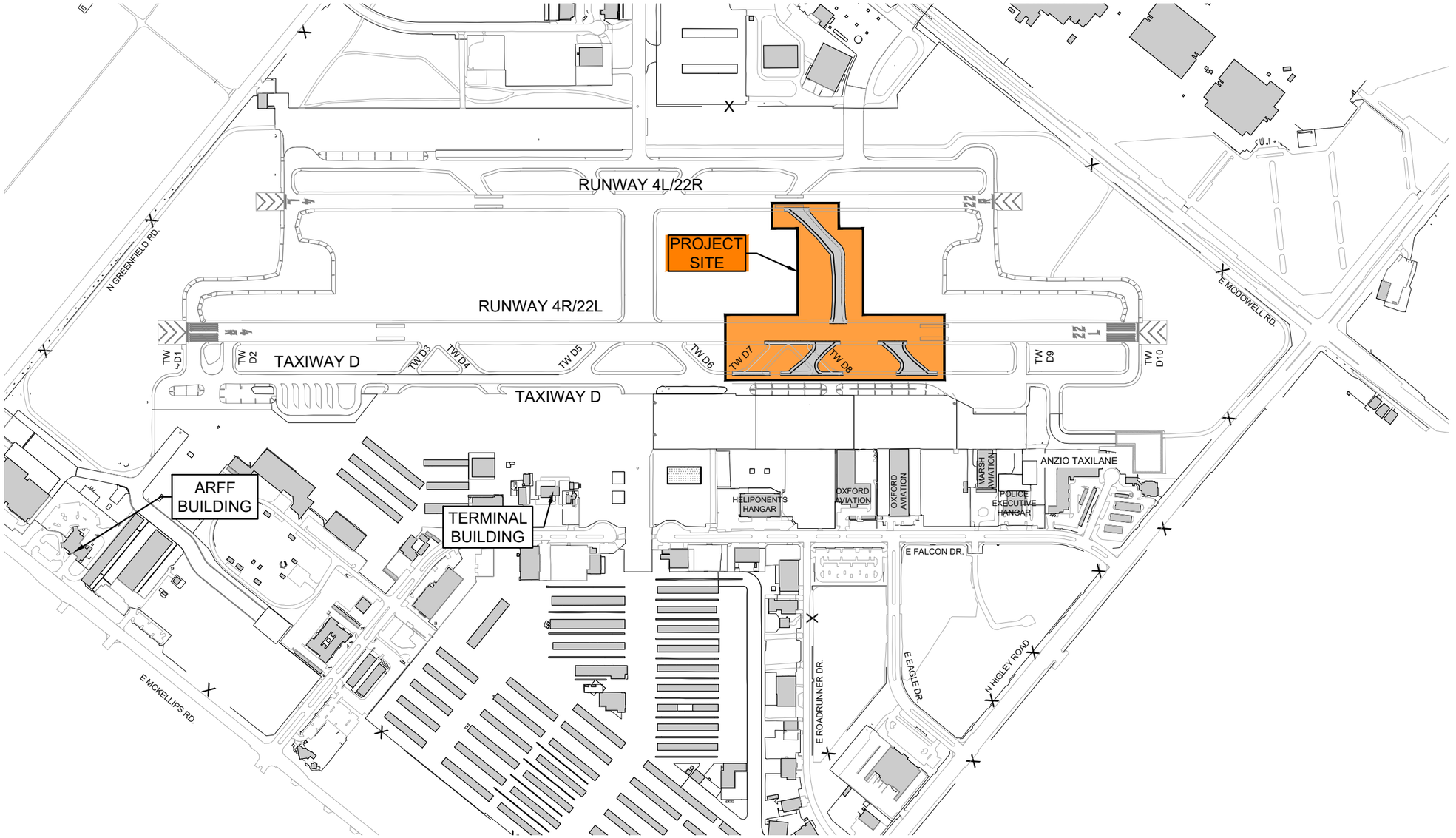
VI. REFERENCES

1. Drainage Policies and Standards for Maricopa County, Arizona, Revised August 22, 2018
2. Drainage Design Manual for Maricopa County, Arizona, February 10, 2011
3. Drainage Report Mesa-Falcon Field Airport Realign and Construct Taxiways A & C, May 2015
4. Drainage Design Manual for Maricopa County - Hydraulics, Arizona, August 15, 2013

APPENDIX A

Vicinity Map

Flood Insurance Rate Map



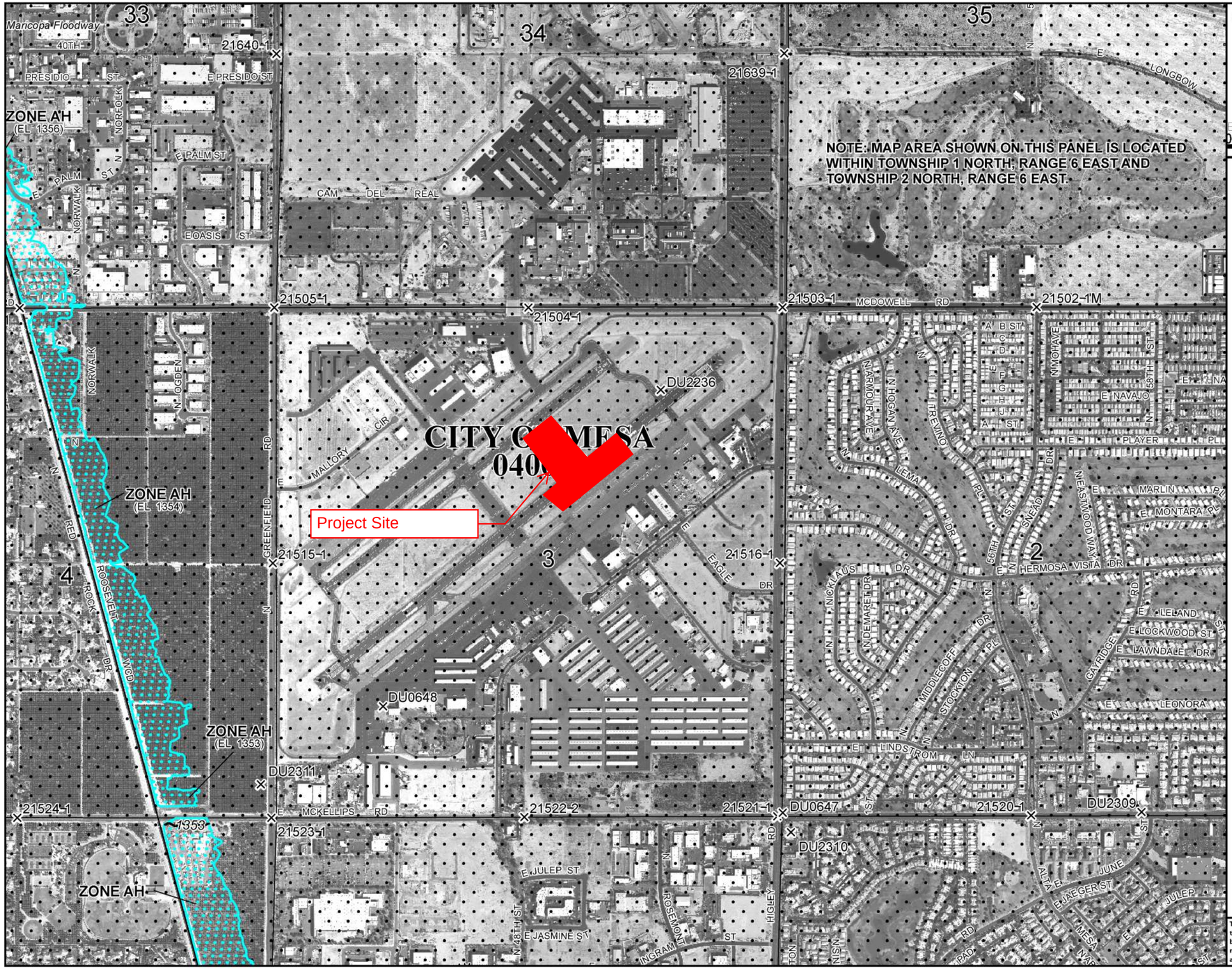
GRAPHIC SCALE
300 0 300 600
(IN FEET)

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FALCON FIELD AIRPORT
VICINITY MAP

SHEET 1 OF 1

Plotted: January 12, 2023 @ 10:09 AM by: Manthead, James
L:\FFZ\Midfield Crossover Taxiway\Eng\J. Eng Report\Drainage Design\Rational Method\Appendix A\Vicinity Map.dwg



National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

00 0 300 600 ME

300 0 300 600

NFIP

PANEL 2280L

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 2280 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	2280	L
MESA, CITY OF	040048	2280	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C2280L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

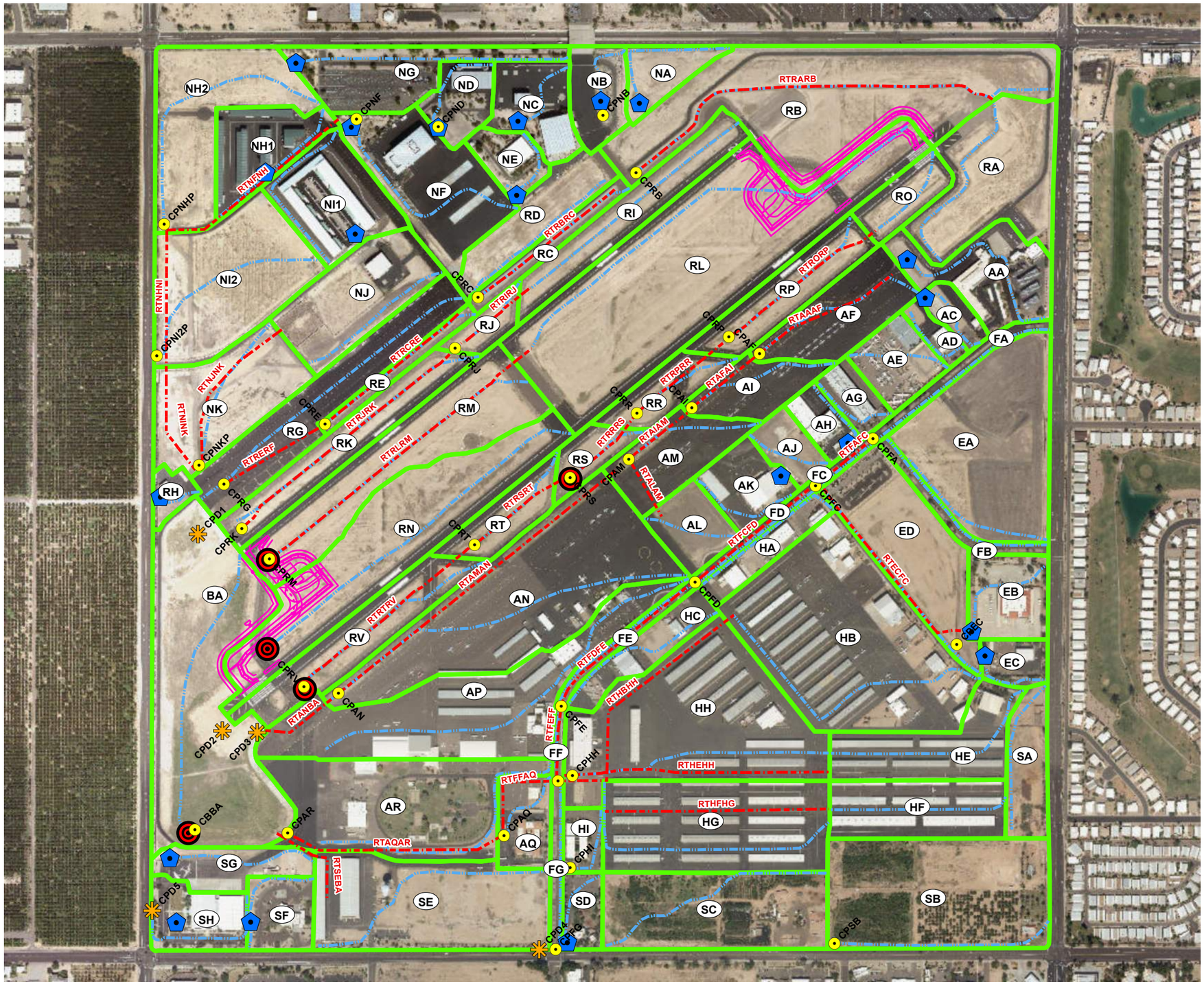
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

APPENDIX B

Drainage Basins from Drainage Report Mesa-Falcon Field Airport Realign and Construct Taxiways A & C. May 2015



Mesa - Falcon Field Airport

Mesa-Falcon Field Airport
Realign & Construct Taxiways 'A' & 'C'

LEGEND

- Taxiway A/C Improvements
- Conveyance Route

Model Storage Type

- Stage-Storage-Discharge Route
- Volume Diversion

Hydrograph Combine Type

- Model Hydrograph Combine
- "Dummy" Model Combine

Dibble Engineering

Appendix D2
Figure D2-2
Developed Conditions Drainage Map

APPENDIX C

Runoff Coefficient Table Data
NOAA Precipitation Data Information
K_b Equation Parameters Table
Existing Rational and Combine Method Calculations
Proposed Rational and Combined Method Calculations

Table 3.2
RUNOFF COEFFICIENTS FOR MARICOPA COUNTY

Land Use Code	Land Use Category	Runoff Coefficients by Storm Frequency[1, 2]							
		2-10 Year		25 Year		50 Year		100 Year	
		min	max	min	max	min	max	min	max
VLDR	Very Low Density Residential[3, 4]	0.33	0.42	0.36	0.46	0.40	0.50	0.41	0.53
LDR	Low Density Residential[3, 4]	0.42	0.48	0.46	0.53	0.50	0.58	0.53	0.60
MDR	Medium Density Residential[3, 4]	0.48	0.65	0.53	0.72	0.58	0.78	0.60	0.82
MFR	Multiple Family Residential[3, 4]	0.65	0.75	0.72	0.83	0.78	0.90	0.82	0.94
I1	Industrial 1[3]	0.60	0.70	0.66	0.77	0.72	0.84	0.75	0.88
I2	Industrial 2[3]	0.70	0.80	0.77	0.88	0.84	0.95	0.88	0.95
C1	Commercial 1[3]	0.55	0.65	0.61	0.72	0.66	0.78	0.69	0.81
C2	Commercial 2[3]	0.75	0.85	0.83	0.94	0.90	0.95	0.94	0.95
P	Pavement and Rooftops	0.75	0.85	0.83	0.94	0.90	0.95	0.94	0.95
GR	Gravel Roadways & Shoulders	0.60	0.70	0.66	0.77	0.72	0.84	0.75	0.88
AG	Agricultural	0.10	0.20	0.11	0.22	0.12	0.24	0.13	0.25
LPC1	Lawns/Parks/Cemeteries (s<5)	0.10	0.25	0.11	0.28	0.12	0.30	0.13	0.31
LPC2	Lawns/Parks/Cemeteries (s>5)	0.25	0.40	0.28	0.44	0.30	0.48	0.31	0.50
DL1	Desert Landscaping 1	0.55	0.85	0.61	0.94	0.66	0.95	0.69	0.95
DL2	Desert Landscaping 2	0.30	0.40	0.33	0.44	0.36	0.48	0.38	0.50
NDR	Undeveloped Desert Rangeland	0.30	0.40	0.33	0.44	0.36	0.48	0.38	0.50
NHS	Hillslopes, Sonoran Desert	0.40	0.55	0.44	0.61	0.48	0.66	0.50	0.69
NMT	Mountain Terrain	0.55	0.80	0.61	0.88	0.66	0.95	0.69	0.95

Notes:

1. Runoff coefficients for 25-, 50- and 100-Year storm frequencies were derived using adjustment factors of 1.10, 1.20 and 1.25, respectively, applied to the 2-10 Year values with an upper limit of 0.95.
2. The ranges of runoff coefficients shown for urban land uses were derived from lot coverage standards specified in the zoning ordinances for Maricopa County.
3. Runoff coefficients for urban land uses are for lot coverage only and do not include the adjacent street and right-of-way, or alleys.
4. Values are based on the NDR terrain class. Values should be increased for NHS and NMT terrain classes by the difference between NHS (or NMT) and the NDR C values, up to a maximum of 0.95. Engineering judgement should be used.
5. Maricopa County has adopted specific values of C for each land use and storm frequency in the Drainage Policies and Standards for Maricopa County, Arizona (Maricopa County, 2007). These are the standard default values. The engineer/hydrologist may develop a computed composite value of C based on actual land uses, but must fully document the computations and assumptions and submit them to Maricopa County for approval. Many jurisdictions in Maricopa County may have adopted specific C coefficient values and procedures. The user should check with the appropriate agency before proceeding.

Table 3.3
RUNOFF COEFFICIENT DESCRIPTIONS FOR MARICOPA COUNTY

Land Use Code	Land Use Category Description
VLDR	40,000 sq. ft. and greater lot size
LDR	12,000 – 40,000 sq. ft. lot size
MDR	6,000 – 12,000 sq. ft. lot size
MFR	1,000 – 6,000 sq. ft. lot size
I1	Light and General
I2	General and Heavy
C1	Light, Neighborhood, Residential
C2	Central, General, Office, Intermediate
P	Asphalt and Concrete, Sloped Rooftops
GR	Graded and Compacted, Treated and Untreated
AG	Tilled Fields, Irrigated Pastures, slopes < 1%
LPC1	Over 80% maintained lawn, slope<5%
LPC2	Over 80% maintained lawn, slope>=5%
DL1	Landscaping with impervious under treatment
DL2	Landscaping without impervious under treatment
NDR	Little topographic relief, slopes < 5%
NHS	Moderate topographic relief, slopes > 5%
NMT	High topographic relief, slopes > 10%

NOAA Atlas 14, Volume 1, Version 5
Location name: Mesa, Arizona, USA*
Latitude: 33.4592°, Longitude: -111.7268°
Elevation: 1380.75 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.184** (0.152-0.231)	**0.241** (0.200-0.302)	**0.326** (0.268-0.408)	**0.392** (0.320-0.487)	**0.483** (0.388-0.596)	**0.553** (0.438-0.679)	**0.624** (0.486-0.764)	**0.698** (0.534-0.852)	**0.796** (0.594-0.971)	**0.871** (0.636-1.06)
10-min	**0.281** (0.232-0.351)	**0.366** (0.304-0.459)	**0.497** (0.408-0.620)	**0.597** (0.487-0.741)	**0.735** (0.590-0.907)	**0.841** (0.667-1.03)	**0.951** (0.740-1.16)	**1.06** (0.813-1.30)	**1.21** (0.904-1.48)	**1.33** (0.968-1.62)
15-min	**0.348** (0.287-0.435)	**0.454** (0.377-0.569)	**0.616** (0.506-0.769)	**0.741** (0.604-0.919)	**0.912** (0.732-1.12)	**1.04** (0.827-1.28)	**1.18** (0.917-1.44)	**1.32** (1.01-1.61)	**1.50** (1.12-1.83)	**1.64** (1.20-2.01)
30-min	**0.469** (0.387-0.586)	**0.612** (0.507-0.767)	**0.830** (0.682-1.04)	**0.998** (0.814-1.24)	**1.23** (0.986-1.51)	**1.40** (1.11-1.73)	**1.59** (1.24-1.94)	**1.77** (1.36-2.16)	**2.02** (1.51-2.47)	**2.21** (1.62-2.70)
60-min	**0.580** (0.479-0.725)	**0.757** (0.628-0.949)	**1.03** (0.844-1.28)	**1.24** (1.01-1.53)	**1.52** (1.22-1.87)	**1.74** (1.38-2.13)	**1.96** (1.53-2.40)	**2.19** (1.68-2.68)	**2.50** (1.87-3.05)	**2.74** (2.00-3.34)
2-hr	**0.666** (0.557-0.807)	**0.862** (0.723-1.05)	**1.15** (0.959-1.39)	**1.37** (1.13-1.66)	**1.67** (1.36-2.01)	**1.91** (1.53-2.29)	**2.15** (1.70-2.58)	**2.39** (1.86-2.87)	**2.72** (2.06-3.27)	**2.98** (2.21-3.60)
3-hr	**0.715** (0.599-0.878)	**0.916** (0.771-1.13)	**1.20** (1.00-1.48)	**1.43** (1.19-1.75)	**1.75** (1.43-2.12)	**2.00** (1.61-2.42)	**2.27** (1.79-2.75)	**2.54** (1.97-3.08)	**2.93** (2.21-3.54)	**3.24** (2.38-3.93)
6-hr	**0.857** (0.739-1.01)	**1.09** (0.937-1.28)	**1.39** (1.20-1.64)	**1.63** (1.39-1.92)	**1.96** (1.65-2.29)	**2.22** (1.84-2.59)	**2.50** (2.03-2.91)	**2.78** (2.22-3.24)	**3.17** (2.46-3.70)	**3.47** (2.64-4.07)
12-hr	**0.958** (0.838-1.11)	**1.21** (1.06-1.40)	**1.53** (1.33-1.76)	**1.78** (1.54-2.04)	**2.12** (1.81-2.43)	**2.38** (2.02-2.72)	**2.64** (2.21-3.03)	**2.91** (2.40-3.34)	**3.28** (2.64-3.79)	**3.57** (2.81-4.15)
24-hr	**1.16** (1.05-1.30)	**1.47** (1.33-1.64)	**1.89** (1.71-2.11)	**2.23** (2.00-2.48)	**2.70** (2.40-2.99)	**3.07** (2.71-3.39)	**3.45** (3.03-3.82)	**3.84** (3.35-4.26)	**4.39** (3.77-4.88)	**4.82** (4.10-5.37)
2-day	**1.25** (1.12-1.41)	**1.60** (1.43-1.79)	**2.08** (1.86-2.33)	**2.46** (2.19-2.76)	**3.00** (2.65-3.35)	**3.42** (3.01-3.82)	**3.87** (3.37-4.32)	**4.33** (3.74-4.84)	**4.97** (4.24-5.58)	**5.48** (4.62-6.17)
3-day	**1.33** (1.19-1.50)	**1.70** (1.52-1.91)	**2.23** (1.99-2.50)	**2.64** (2.35-2.96)	**3.23** (2.86-3.62)	**3.71** (3.26-4.14)	**4.21** (3.67-4.71)	**4.73** (4.09-5.30)	**5.47** (4.65-6.14)	**6.06** (5.10-6.82)
4-day	**1.42** (1.26-1.60)	**1.81** (1.61-2.04)	**2.37** (2.11-2.66)	**2.83** (2.51-3.17)	**3.47** (3.06-3.89)	**3.99** (3.50-4.46)	**4.55** (3.96-5.09)	**5.13** (4.43-5.75)	**5.96** (5.07-6.69)	**6.63** (5.59-7.47)
7-day	**1.57** (1.39-1.77)	**2.00** (1.78-2.26)	**2.62** (2.32-2.96)	**3.13** (2.77-3.52)	**3.84** (3.38-4.32)	**4.42** (3.87-4.97)	**5.03** (4.37-5.66)	**5.69** (4.89-6.40)	**6.60** (5.60-7.44)	**7.34** (6.17-8.31)
10-day	**1.71** (1.53-1.92)	**2.18** (1.95-2.45)	**2.86** (2.56-3.21)	**3.41** (3.04-3.82)	**4.18** (3.70-4.67)	**4.80** (4.22-5.35)	**5.45** (4.77-6.09)	**6.14** (5.32-6.86)	**7.11** (6.08-7.94)	**7.88** (6.67-8.83)
20-day	**2.11** (1.88-2.37)	**2.71** (2.41-3.04)	**3.55** (3.16-3.99)	**4.20** (3.73-4.71)	**5.07** (4.49-5.67)	**5.74** (5.05-6.42)	**6.41** (5.62-7.18)	**7.10** (6.19-7.96)	**8.03** (6.93-9.02)	**8.74** (7.49-9.84)
30-day	**2.45** (2.20-2.74)	**3.15** (2.82-3.51)	**4.13** (3.70-4.60)	**4.87** (4.36-5.42)	**5.88** (5.23-6.53)	**6.64** (5.89-7.38)	**7.43** (6.56-8.25)	**8.23** (7.22-9.15)	**9.30** (8.08-10.4)	**10.1** (8.73-11.3)
45-day	**2.85** (2.55-3.18)	**3.66** (3.28-4.09)	**4.79** (4.29-5.35)	**5.64** (5.03-6.28)	**6.74** (6.01-7.50)	**7.56** (6.72-8.43)	**8.39** (7.42-9.36)	**9.22** (8.10-10.3)	**10.3** (8.98-11.5)	**11.1** (9.63-12.5)
60-day	**3.14** (2.83-3.49)	**4.04** (3.64-4.49)	**5.28** (4.75-5.87)	**6.18** (5.55-6.87)	**7.35** (6.58-8.16)	**8.21** (7.33-9.12)	**9.07** (8.07-10.1)	**9.91** (8.77-11.0)	**11.0** (9.67-12.3)	**11.8** (10.3-13.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

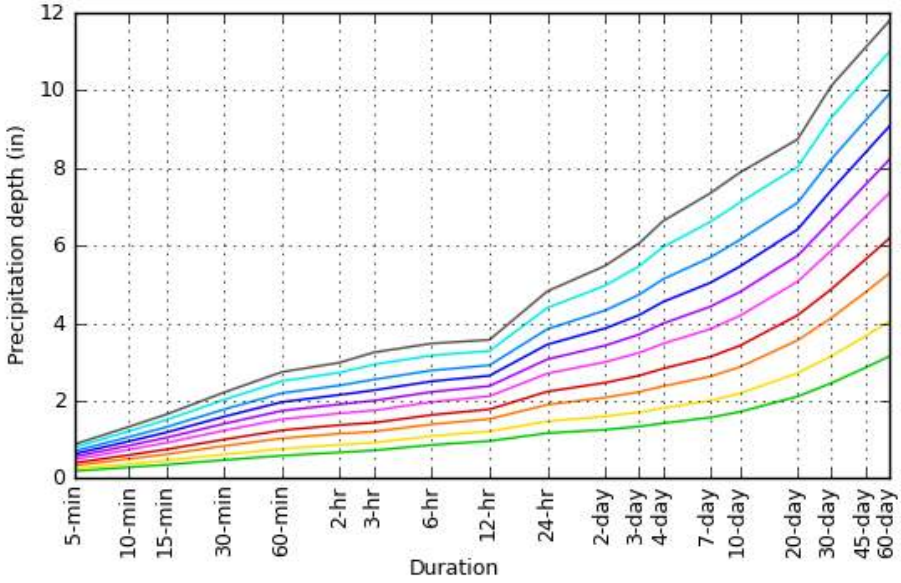
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

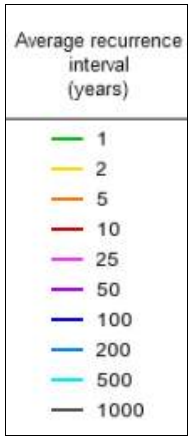
Please refer to NOAA Atlas 14 document for more information.

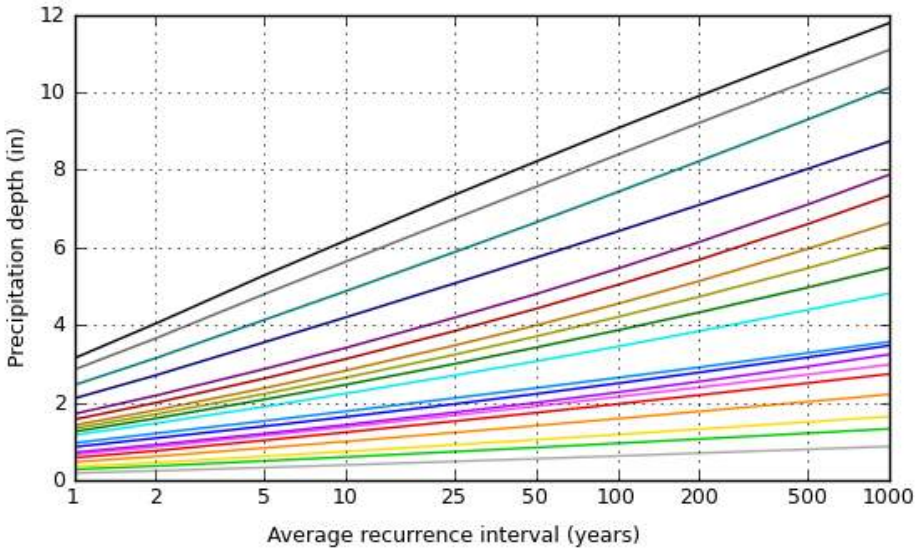
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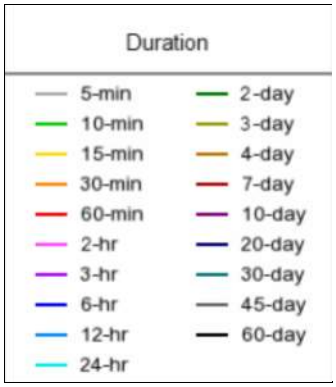
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.4592°, Longitude: -111.7268°









NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Wed Jan 4 17:05:08 2023

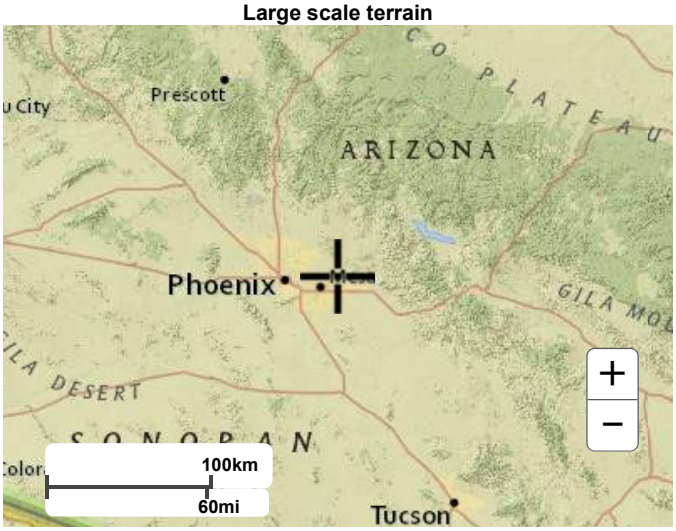
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Maps & aerials

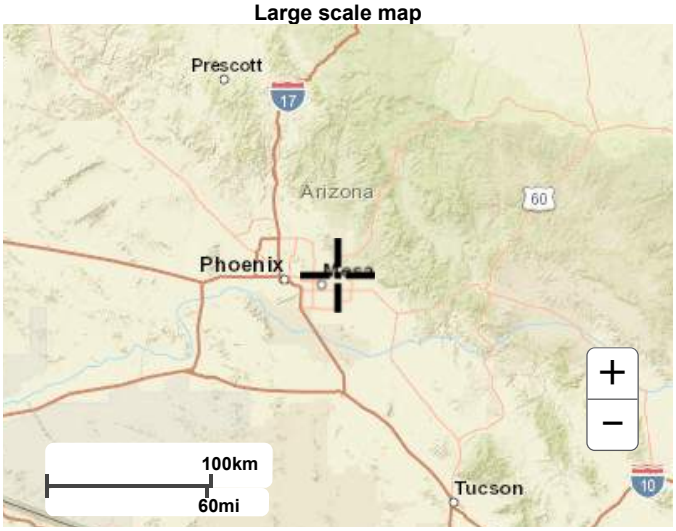
Small scale terrain



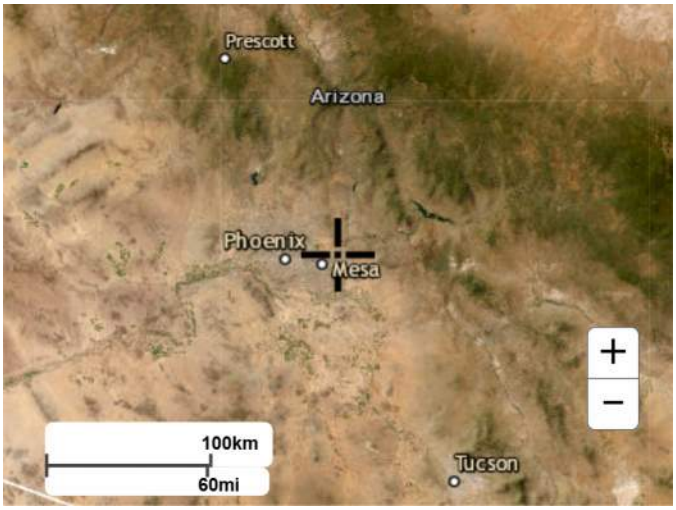
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

IDF Curve derived from NOAA Atlas 14, Volume1, Version 5, Point Precipitation Frecency Estimate Table

	5-Year (Series 1)	10-Year (Series 2)	100-year (Series 3)
Time(min)	inches/hour	inches/hour	inches/hour
5	3.91	4.70	7.49
10	2.98	3.58	5.71
15	2.46	2.96	4.72
30	1.66	2.00	3.18
60	1.03	1.24	1.96
120	0.58	0.69	1.08

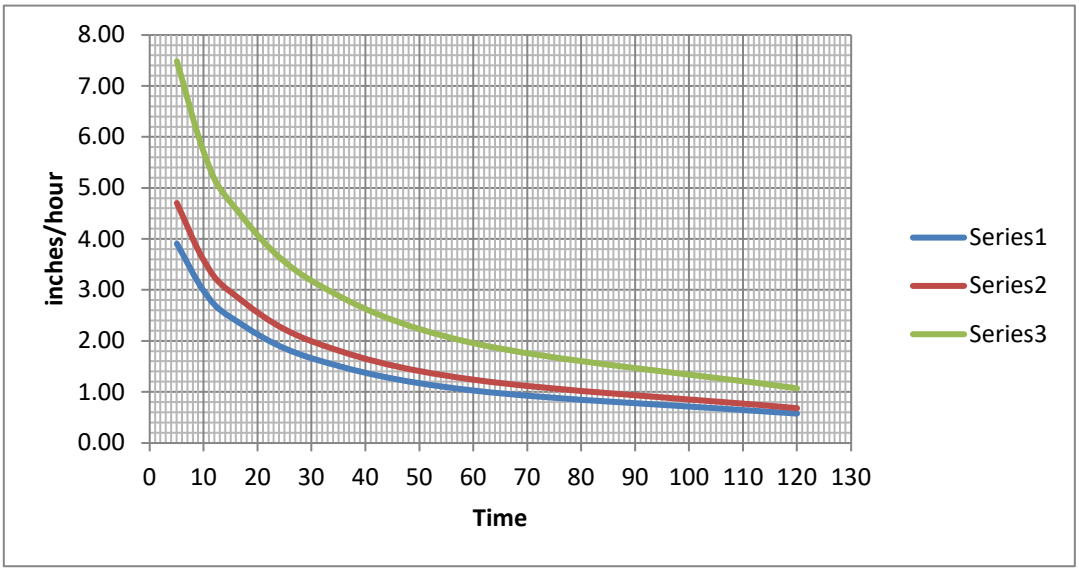


Table 3.1
EQUATION FOR ESTIMATING K_B IN THE T_C EQUATION

$K_b = m \log_{10} A + b$ **Where A is drainage area, in acres**				
Type	**Description**	**Typical Applications**	**Equation Parameters**	
			m	***b***
A	Minimal roughness: Land surfaces that are relatively smooth and/or well graded. Surface runoff is sheet flow.	Commercial/industrial areas Residential areas Parks and golf courses	-0.00625	0.04
B	Moderately low roughness: Land surfaces have irregularly spaced roughness elements that protrude from the surface but are still relatively uniform. Surface runoff is predominately sheet flow around the roughness elements.	Agricultural fields Pastures Desert rangelands Undeveloped urban lands	-0.01375	0.08
C	Moderately high roughness: Land surfaces that have significant large to medium-sized roughness elements and/or poorly graded land surfaces that cause the flow to be diverted around the roughness elements. Surface runoff is sheet flow for short distances draining into meandering drainage paths.	Hillslopes Brushy alluvial fans Hilly rangelands Disturbed lands, mining, etc. Forests with underbrush	-0.025	0.15
D	Maximum roughness: Rough land surfaces with torturous flow paths. Surface runoff is concentrated in numerous short flow paths that are often oblique to the main flow direction.	Mountains Some wetlands	-0.030	0.20

Note: A is the area of the entire subbasin, not the area of the surface type A, B, C or D within the subbasin.

EXISTING COMPOSITE "C" VALUES

Airport: Falcon Field Airport

Calculated by: JHM **Date:** January 6, 2023

Checked by: JBW

Basin	Total Area (acres)	Total Area (sq. ft.)	(P) Area (sq. ft.)	(GR) Area (sq. ft.)	(NDR) Area (sq. ft.)	Total C_5	Total C_{10}	Total C_{100}
Pavement & Rooftops (P)						0.80	0.85	0.95
Gravel Roadways & Shoulders (GR)						0.65	0.70	0.88
Undeveloped Desert Rangeland (NDR)						0.35	0.40	0.50
RL	34.58	1,506,488	455,696	130,923	919,869	0.51	0.56	0.67
RO	3.42	149,128	75,073	0	74,055	0.58	0.63	0.73
RP	6.47	282,036	135,456	0	146,579	0.57	0.62	0.72
RR	3.93	171,399	109,776	0	61,623	0.64	0.69	0.79

COMPOSITE "C" VALUES (COMBINED)

Basin	Total Area (acres)	Total Area (sq. ft.)	(P) Area (sq. ft.)	(GR) Area (sq. ft.)	(NDR) Area (sq. ft.)	Total C_5	Total C_{10}	Total C_{100}
RL	34.58	1,506,488	455,696	130,923	919,869	0.51	0.56	0.67
RO	3.42	149,128	75,073	0	74,055	0.58	0.63	0.73
RP	9.90	431,163	210,529	0	220,634	0.57	0.62	0.72
RR	13.83	602,563	320,305	0	282,258	0.59	0.64	0.74

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW **Date:** 6-Jan-23

Values and Equations per Drainage Design Manual for Maricopa County

K_b in the Tc Equation
$K_b = (m)\log_{10}(A) + b$
m = Parameters in Table 3.1
b = Parameters in Table 3.1
(A) = Basin Area in Acres

Time of Concentration Equation 3.2
$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$
Tc = time in Concentration , in hours
L = length in longest flow path, in miles
K_b = watershed resistance coefficient
S = watercourse slope, in feet/mile
i = rainfall intensity, in inches/hour

For Combined Basins used the Combined Watershed Method as described on pages 3-10, and 3-11 of the Drainage Design Manual for Maricopa County

(EXISTING RATIONAL METHOD PROCEDURE 5-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

$$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

Sub-Basin Data				$K_b = (m)\log_{10}(A) + b$				Travel Time (T_C)				Basin i	Direct Runoff
Cons. Pt. #	Area Design	Area (ac)	C 5 yr.	m (ft)	b (%)	K_b	i (in/hr)	L (miles)	Slope (feet/mile)	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)
RL	RL	34.58	0.51	-0.00625	0.04	0.0304	2.09	0.539	35.55	20.39	20.39	2.09	37.0
RO	RO	3.42	0.58	-0.00625	0.04	0.0367	3.05	0.115	27.57	9.72	10.00	2.98	5.9
RP	RP	6.47	0.57	-0.00625	0.04	0.0349	2.56	0.206	26.74	13.70	13.70	2.56	9.4
RR	RR	3.93	0.64	-0.00625	0.04	0.0363	3.29	0.132	54.54	8.16	10.00	2.98	7.5

(EXISTING COMBINED WATERSHED APPROACH 5-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

Sub-Basin Data, (C_W is weighted from rational				K_b = Weighted from the rational method				Travel Time (T_C)				Basin i	Combined Runoff	Remarks
Cons. Pt. #	Area Design	Area (ac)	C_W 5 yr.			K_b	i (in/hr)	L (miles)	Slope feet/mile	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)	
RL	RL	34.58	0.51			0.0304	2.09	0.539	35.55	20.39	20.39	2.09	37.0	Conveys flows to existing
RO	RO	3.42	0.58			0.0367	3.05	0.115	27.57	9.72	10.00	2.98	5.9	Convey flows to RP
RP	RP	9.90	0.57			0.0355	1.83	0.453	19.53	25.72	25.72	1.83	10.3	Convey flows to RR
RR	RR	13.83	0.59			0.0357	2.01	0.453	30.28	21.71	21.71	2.01	16.4	Convey flows to existing

(EXISTING RATIONAL METHOD PROCEDURE 10-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

$$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

Sub-Basin Data				$K_b = (m)\log_{10}(A) + b$				Travel Time (T_C)				Basin i	Direct Runoff
Cons. Pt. #	Area Design	Area (ac)	C 10 yr.	m (ft)	b (%)	K_b	i (in/hr)	L (miles)	Slope (feet/mile)	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)
RL	RL	34.58	0.56	-0.00625	0.04	0.0304	2.66	0.539	35.55	18.60	18.60	2.66	51.7
RO	RO	3.42	0.63	-0.00625	0.04	0.0367	3.70	0.115	27.57	9.03	10.00	3.58	7.7
RP	RP	6.47	0.62	-0.00625	0.04	0.0349	3.18	0.206	26.74	12.61	12.61	3.18	12.7
RR	RR	3.93	0.69	-0.00625	0.04	0.0363	4.12	0.132	54.54	7.49	10.00	3.58	9.7

(EXISTING COMBINED WATERSHED APPROACH 10-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

Sub-Basin Data, (C_W is weighted from rational method)				K_b = Weighted from the rational method				Travel Time (T_C)				Basin i	Combined Runoff	Remarks
Cons. Pt. #	Area Design	Area (ac)	C_W 10 yr.			K_b	i (in/hr)	L (miles)	Slope feet/mile	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)	
RL	RL	34.58	0.56			0.0304	2.66	0.539	35.55	18.60	18.60	2.66	51.7	Conveys flows to existing
RO	RO	3.42	0.63			0.0367	3.70	0.115	27.57	9.03	10.00	3.58	7.7	Convey flows to RP
RP	RP	9.90	0.62			0.0355	2.31	0.453	19.53	23.51	23.51	2.31	14.2	Convey flows to RR
RR	RR	13.83	0.64			0.0357	2.59	0.453	30.28	19.71	19.71	2.59	22.9	Convey flows to existing

(EXISTING RATIONAL METHOD PROCEDURE 100-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

$$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

Sub-Basin Data				$K_b = (m)\log_{10}(A) + b$				Travel Time (T_C)				Basin i	Direct Runoff
Cons. Pt. #	Area Design	Area (ac)	C 100 yr.	m (ft)	b (%)	K_b	i (in/hr)	L (miles)	Slope (feet/mile)	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)
RL	RL	34.58	0.67	-0.00625	0.04	0.0304	4.78	0.539	35.55	14.89	14.89	4.78	110.6
RO	RO	3.42	0.73	-0.00625	0.04	0.0367	6.60	0.115	27.57	7.25	10.00	5.71	14.2
RP	RP	6.47	0.72	-0.00625	0.04	0.0349	6.85	0.206	26.74	9.42	10.00	5.71	26.5
RR	RR	3.93	0.79	-0.00625	0.04	0.0363	7.09	0.132	54.54	6.09	10.00	5.71	17.7

(EXISTING COMBINED WATERSHED APPROACH 100-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

Sub-Basin Data, (C_W is weighted from rational method)				K_b = Weighted from the rational method				Travel Time (T_C)				Basin i	Combined Runoff	Remarks
Cons. Pt. #	Area Design	Area (ac)	C_W 100 yr.			K_b	i (in/hr)	L (miles)	Slope feet/mile	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)	
RL	RL	34.58	0.67			0.0304	4.78	0.539	35.55	14.89	14.89	4.78	110.6	Conveys flows to existing
RO	RO	3.42	0.73			0.0367	6.60	0.115	27.57	7.25	10.00	5.71	14.2	Convey flows to RP
RP	RP	9.90	0.72			0.0355	4.22	0.453	19.53	18.70	18.70	4.22	30.1	Convey flows to RR
RR	RR	13.83	0.74			0.0357	4.63	0.453	30.28	15.81	15.81	4.63	47.3	Convey flows to existing

Existing Flow Table						
Concentration Point	5-Year Flow (cfs)		10-Year Flow (cfs)		100-Year Flow (cfs)	
	Rational Method	Combined Method	Rational Method	Combined Method	Rational Method	Combined Method
RL	37.0	37.0	51.7	51.7	110.6	110.6
RO	5.9	5.9	7.7	7.7	14.2	14.2
RP	9.4	10.3	12.7	14.2	26.5	30.1
RR	7.5	16.4	9.7	22.9	17.7	47.3

PROPOSED COMPOSITE "C" VALUES

Airport: Falcon Field Airport

Calculated by: JHM **Date:** January 6, 2023

Checked by: JBW

Basin	Total Area (acres)	Total Area (sq. ft.)	(P) Area (sq. ft.)	(GR) Area (sq. ft.)	(NDR) Area (sq. ft.)	Total C_5	Total C_{10}	Total C_{100}
Pavement & Rooftops (P)						0.80	0.85	0.95
Gravel Roadways & Shoulders (GR)						0.65	0.70	0.88
Undeveloped Desert Rangeland (NDR)						0.35	0.40	0.50
RL-1	16.19	705,399	273,836	130,923	300,641	0.58	0.63	0.75
RL-2	2.00	86,936	32,813	0	54,123	0.52	0.57	0.67
RL-3	16.39	714,153	195,243	0	518,911	0.47	0.52	0.62
RO	3.42	149,128	75,073	0	74,055	0.58	0.63	0.73
RP-1	3.33	145,099	70,385	0	74,715	0.57	0.62	0.72
RP-2	2.73	119,068	65,251	0	53,816	0.60	0.65	0.75
RP-3	4.35	189,268	107,504	0	81,764	0.61	0.66	0.76

COMPOSITE "C" VALUES (COMBINED)

Basin	Total Area (acres)	Total Area (sq. ft.)	(P) Area (sq. ft.)	(GR) Area (sq. ft.)	(NDR) Area (sq. ft.)	Total C_5	Total C_{10}	Total C_{100}
RL-1	16.19	705,399	273,836	130,923	300,641	0.58	0.63	0.75
RL-2	2.00	86,936	32,813	0	54,123	0.52	0.57	0.67
RL-3	34.58	1,506,488	501,892	130,923	873,674	0.53	0.58	0.68
RO	3.42	149,128	75,073	0	74,055	0.58	0.63	0.73
RP-1	6.75	294,227	145,457	0	148,769	0.57	0.62	0.72
RP-2	9.49	413,294	210,709	0	202,586	0.58	0.63	0.73
RP-3	13.83	602,563	318,213	0	284,350	0.59	0.64	0.74

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW **Date:** 6-Jan-23

Values and Equations per Drainage Design Manual for Maricopa County

K_b in the Tc Equation
$K_b = (m)\log_{10}(A) + b$
m = Parameters in Table 3.1
b = Parameters in Table 3.1
(A) = Basin Area in Acres

Time of Concentration Equation 3.2
$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$
Tc = time in Concentration , in hours
L = length in longest flow path, in miles
K_b = watershed resistance coefficient
S = watercourse slope, in feet/mile
i = rainfall intensity, in inches/hour

For Combined Basins used the Combined Watershed Method as described on pages 3-10, and 3-11 of the Drainage Design Manual for Maricopa County

(PROPOSED RATIONAL METHOD PROCEDURE 5-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

$$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

Sub-Basin Data				$K_b = (m)\log_{10}(A) + b$				Travel Time (T_C)				Basin i	Direct Runoff
Cons. Pt. #	Area Design	Area (ac)	C 5 yr.	m (ft)	b (%)	K_b	i (in/hr)	L (miles)	Slope (feet/mile)	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)
RL-1	RL-1	16.19	0.58	-0.00625	0.04	0.0324	2.42	0.356	40.81	15.54	15.54	2.42	22.7
RL-2	RL-2	2.00	0.52	-0.00625	0.04	0.0381	3.80	0.085	72.12	5.82	10.00	2.98	3.1
RL-3	RL-3	16.39	0.47	-0.00625	0.04	0.0324	2.78	0.235	52.00	11.10	11.10	2.78	21.6
RO	RO	3.42	0.58	-0.00625	0.04	0.0367	3.05	0.115	27.57	9.72	10.00	2.98	5.9
RP-1	RP-1	3.33	0.57	-0.00625	0.04	0.0367	3.37	0.114	48.16	7.84	10.00	2.98	5.6
RP-2	RP-2	2.73	0.60	-0.00625	0.04	0.0373	3.61	0.111	68.38	6.81	10.00	2.98	4.9
RP-3	RP-3	4.35	0.61	-0.00625	0.04	0.036	3.27	0.132	54.55	8.14	10.00	2.98	7.8

(PROPOSED COMBINED WATERSHED APPROACH 5-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

Sub-Basin Data, (C_W is weighted from rational method)				K_b = Weighted from the rational method				Travel Time (T_C)				Basin i	Combined Runoff	Remarks
Cons. Pt. #	Area Design	Area (ac)	C_W 5 yr.			K_b	i (in/hr)	L (miles)	Slope feet/mile	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)	
RL-1	RL-1	16.19	0.58			0.0324	2.42	0.356	40.81	15.54	15.54	2.42	22.7	Conveys flows to RL-3
RL-2	RL-2	2.00	0.52			0.0381	3.80	0.085	72.12	5.82	10.00	2.98	3.1	Conveys flows to RL-3
RL-3	RL-3	34.58	0.53			0.0328	2.04	0.539	35.55	21.40	21.40	1.99	36.2	Conveys flows to existing
RO	RO	3.42	0.58			0.0367	3.05	0.115	27.57	9.72	10.00	2.98	5.9	Convey flows to RP-1
RP-1	RP-1	6.75	0.57			0.0367	2.59	0.228	38.77	13.13 13.1	13.13	2.59	10.0	Convey flows to RP-2
RP-2	RP-2	9.49	0.58			0.0369	2.35	0.316	33.89	16.76	16.76	2.35	12.9	Convey flows to RP-3
RP-3	RP-3	13.83	0.59			0.0366	1.98	0.453	30.28	22.10	22.10	1.98	16.1	Convey flows to existing

(PROPOSED RATIONAL METHOD PROCEDURE 10-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

$$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

Sub-Basin Data				$K_b = (m)\log_{10}(A) + b$				Travel Time (T_C)				Basin i	Direct Runoff
Cons. Pt. #	Area Design	Area (ac)	C 10 yr.	m (ft)	b (%)	K_b	i (in/hr)	L (miles)	Slope (feet/mile)	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)
RL-1	RL-1	16.19	0.63	-0.00625	0.04	0.0324	3.01	0.356	40.81	14.31	14.31	2.98	30.4
RL-2	RL-2	2.00	0.57	-0.00625	0.04	0.0381	4.61	0.085	72.12	5.41	10.00	3.58	4.1
RL-3	RL-3	16.39	0.52	-0.00625	0.04	0.0324	3.52	0.235	52.00	10.15	10.15	3.52	30.2
RO	RO	3.42	0.63	-0.00625	0.04	0.0367	3.70	0.115	27.57	9.03	10.00	3.58	7.7
RP-1	RP-1	3.33	0.62	-0.00625	0.04	0.0367	3.97 3.97	0.114	48.16	7.37 7.37	10.00	3.58	7.4
RP-2	RP-2	2.73	0.65	-0.00625	0.04	0.0373	4.41	0.111	68.38	6.31	10.00	3.58	6.3
RP-3	RP-3	4.35	0.66	-0.00625	0.04	0.036	4.13	0.132	54.55	7.45	10.00	3.58	10.2

(PROPOSED COMBINED WATERSHED APPROACH 10-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

Sub-Basin Data, (C_W is weighted from rational method)				K_b = Weighted from the rational method				Travel Time (T_C)				Basin i	Combined Runoff	Remarks
Cons. Pt. #	Area Design	Area (ac)	C_W 10 yr.			K_b	i (in/hr)	L (miles)	Slope feet/mile	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)	
RL-1	RL-1	16.19	0.63			0.0324	3.01	0.356	40.81	14.31	14.31	2.98	30.4	Conveys flows to RL-3
RL-2	RL-2	2.00	0.57			0.0381	4.61	0.085	72.12	5.41	10.00	3.58	4.1	Conveys flows to RL-3
RL-3	RL-3	34.58	0.58			0.0328	2.58	0.539	35.55	19.57	19.57	2.58	51.4	Conveys flows to existing
RO	RO	3.42	0.63			0.0367	3.70	0.115	27.57	9.03	10.00	3.58	7.7	Convey flows to RP-1
RP-1	RP-1	6.75	0.62			0.0367	3.19 3.19	0.228	38.77	12.13 12.13	12.13	3.19	13.4	Convey flows to RP-2
RP-2	RP-2	9.49	0.63			0.0369	2.94	0.316	33.89	15.40	15.40	2.94	17.6	Convey flows to RP-3
RP-3	RP-3	13.83	0.64			0.0366	2.58	0.453	30.28	19.98	19.98	2.58	22.8	Convey flows to existing

(PROPOSED RATIONAL METHOD PROCEDURE 100-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

$$T_C = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$$

Sub-Basin Data				$K_b = (m)\log_{10}(A) + b$				Travel Time (T_C)				Basin i	Direct Runoff
Cons. Pt. #	Area Design	Area (ac)	C 100 yr.	m (ft)	b (%)	K_b	i (in/hr)	L (miles)	Slope (feet/mile)	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)
RL-1	RL-1	16.19	0.75	-0.00625	0.04	0.0324	5.30	0.356	40.81	11.54 11.74	11.54	5.30	64.0
RL-2	RL-2	2.00	0.67	-0.00625	0.04	0.0381	7.49	0.085	72.12	4.50 4.50	10.00	5.71	7.6
RL-3	RL-3	16.39	0.62	-0.00625	0.04	0.0324	6.24	0.235	52.00	8.17	10.00	5.71	58.3
RO	RO	3.42	0.73	-0.00625	0.04	0.0367	6.60	0.115	27.57	7.25	10.00	5.71	14.2
RP-1	RP-1	3.33	0.72	-0.00625	0.04	0.0367	7.29	0.114	48.16	5.85	10.00	5.71	13.7
RP-2	RP-2	2.73	0.75	-0.00625	0.04	0.0373	7.39	0.111	68.38	5.19	10.00	5.71	11.7
RP-3	RP-3	4.35	0.76	-0.00625	0.04	0.036	7.05	0.132	54.55	6.08	10.00	5.71	18.7

(PROPOSED COMBINED WATERSHED APPROACH 100-YEAR)

Airport: Falcon Field Airport
Calculated by: JHM
Checked by: JBW
Date: January 6, 2023

Sub-Basin Data, (C_W is weighted from rational method)				K_b = Weighted from the rational method				Travel Time (T_C)				Basin i	Combined Runoff	Remarks
Cons. Pt. #	Area Design	Area (ac)	C_W 100 yr.			K_b	i (in/hr)	L (miles)	Slope feet/mile	Tc (min)	Comp. Tc (min.)	i (in/hr)	Q=C*A*i (cfs)	
RL-1	RL-1	16.19	0.75			0.0324	5.30	0.356	40.81	11.54	11.54	5.30	64.0	Conveys flows to RL-3
RL-2	RL-2	2.00	0.67			0.0381	7.49	0.085	72.12	4.50	10.00	5.71	7.6	Conveys flows to RL-3
RL-3	RL-3	34.58	0.68			0.0328	4.65	0.539	35.55	15.65	15.65	4.68	110.5	Conveys flows to existing
RO	RO	3.42	0.73			0.0367	6.60	0.115	27.57	7.25	10.00	5.71	14.2	Convey flows to RP-1
RP-1	RP-1	6.75	0.72			0.0367	5.88	0.228	38.77	9.62	10.00	5.71	27.9	Convey flows to RP-2
RP-2	RP-2	9.49	0.73			0.0369	5.05	0.316	33.89	12.54	12.54	5.05	34.9	Convey flows to RP-3
RP-3	RP-3	13.83	0.74			0.0366	4.59	0.453	30.28	16.06	16.06	4.59	46.8	Convey flows to existing

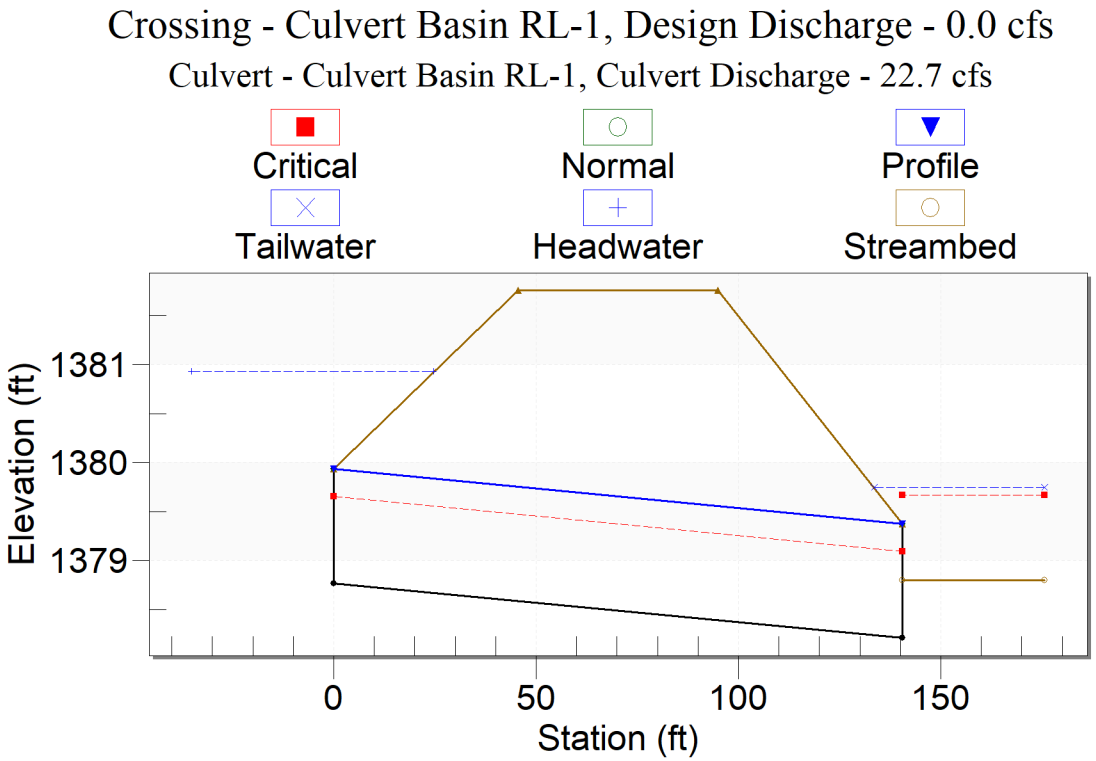
Proposed Flow Table						
Concentration Point	5-Year Flow (cfs)		10-Year Flow (cfs)		100-Year Flow (cfs)	
	Rational Method	Combined Method	Rational Method	Combined Method	Rational Method	Combined Method
RL-1	22.7	22.7	30.4	30.4	64.0	64.0
RL-2	3.1	3.1	4.1	4.1	7.6	7.6
RL-3	21.6	36.2	30.2	51.4	58.3	110.5
RO	5.9	5.9	7.7	7.7	14.2	14.2
RP-1	5.6	10.0	7.4	13.4	13.7	27.9
RP-2	4.9	12.9	6.3	17.6	11.7	34.9
RP-3	7.8	16.1	10.2	22.8	18.7	46.8

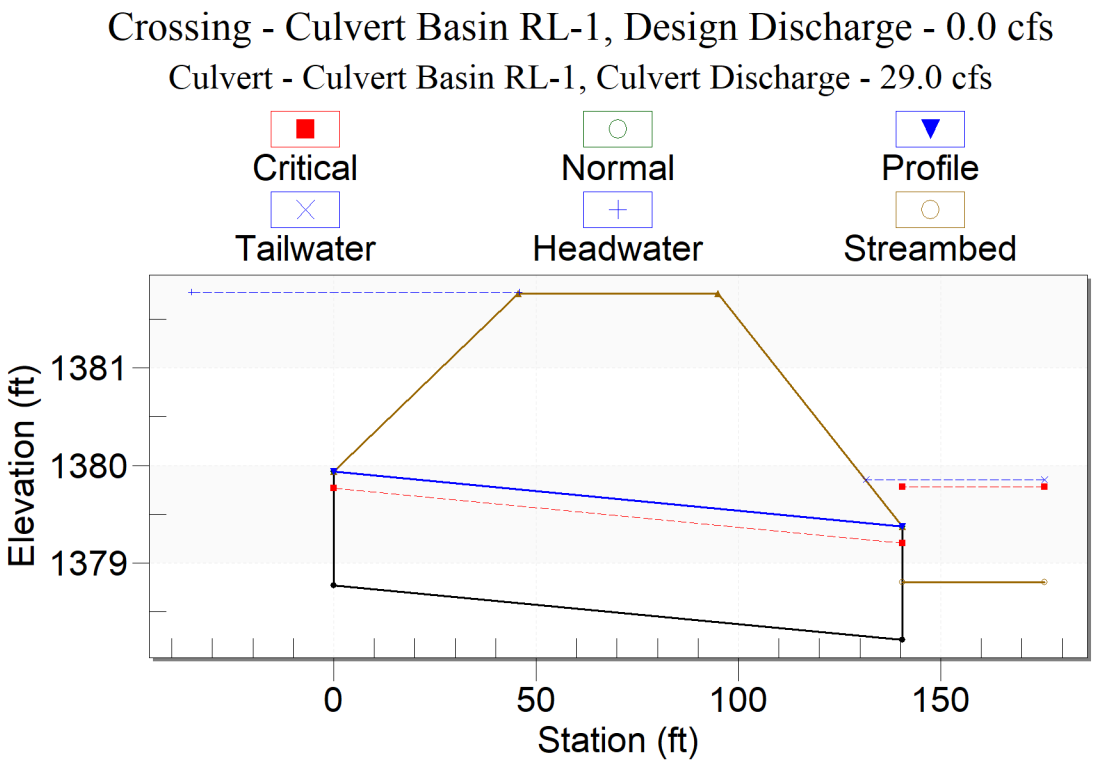
APPENDIX D

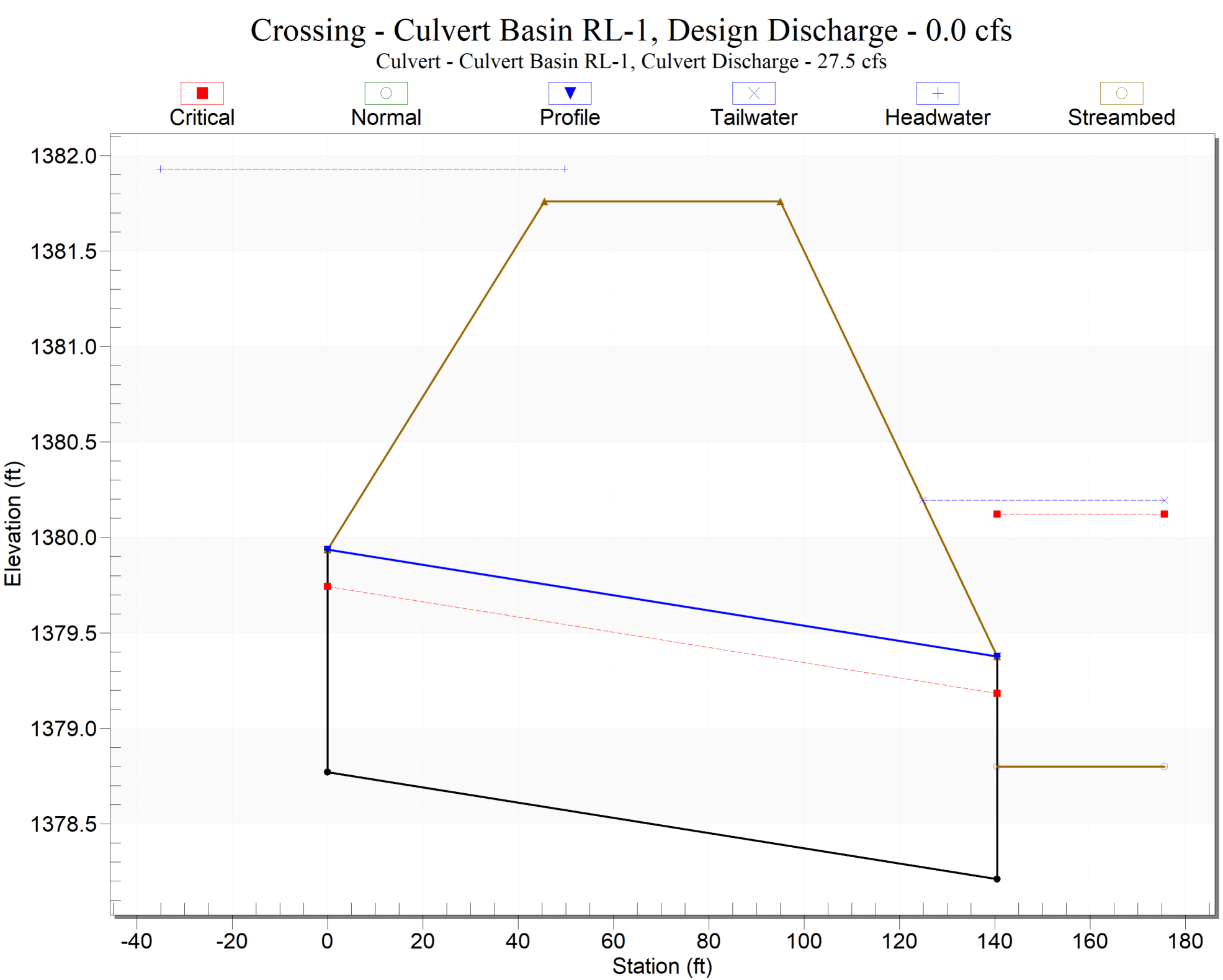
Culvert Calculations

Culvert Summary Table - Culvert Basin RL-1

Storm Event	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5-Year	22.70	22.70	1380.93	1.47	2.16	4-FFf	1.17	0.88	1.17	0.94	4.25	3.19
10-Year	30.40	28.97	1381.78	1.90	3.01	4-FFf	1.17	1.00	1.17	1.05	5.43	3.43
100-Year	64.40	27.49	1381.93	1.79	3.16	4-FFf	1.17	0.97	1.17	1.40	5.15	4.14


Crossing - Culvert Basin RL-1, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RL-1, Culvert Discharge - 22.7 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
Elevation (ft)
1381
1380
1379
0
50
100
150
Station (ft)


Crossing - Culvert Basin RL-1, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RL-1, Culvert Discharge - 29.0 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
Elevation (ft)
1381
1380
1379
0
50
100
150
Station (ft)

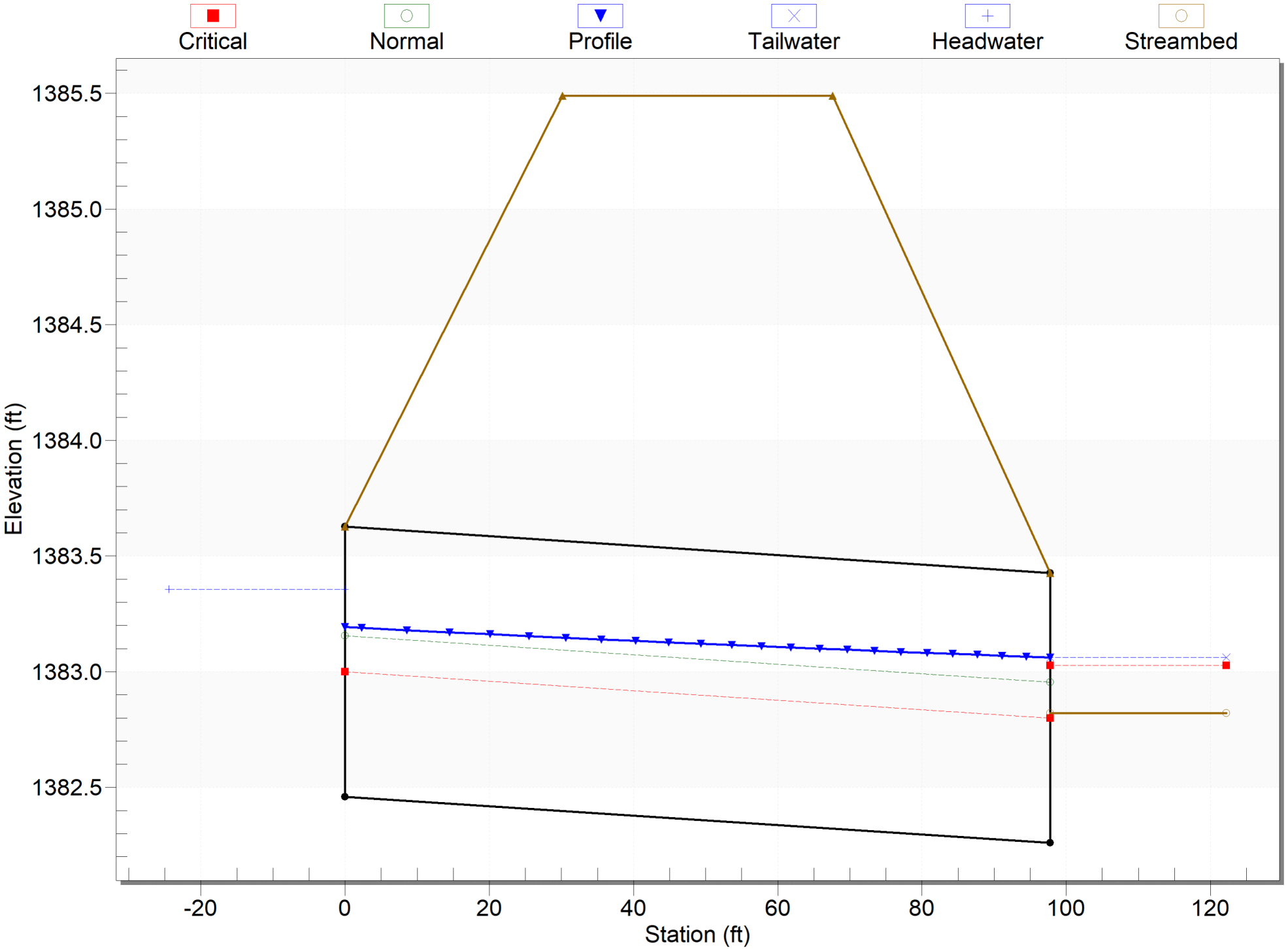

Crossing - Culvert Basin RL-1, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RL-1, Culvert Discharge - 27.5 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
1382.0
1381.5
1381.0
1380.5
1380.0
1379.5
1379.0
1378.5
Elevation (ft)
-40
-20
0
20
40
60
80
100
120
140
160
180
Station (ft)

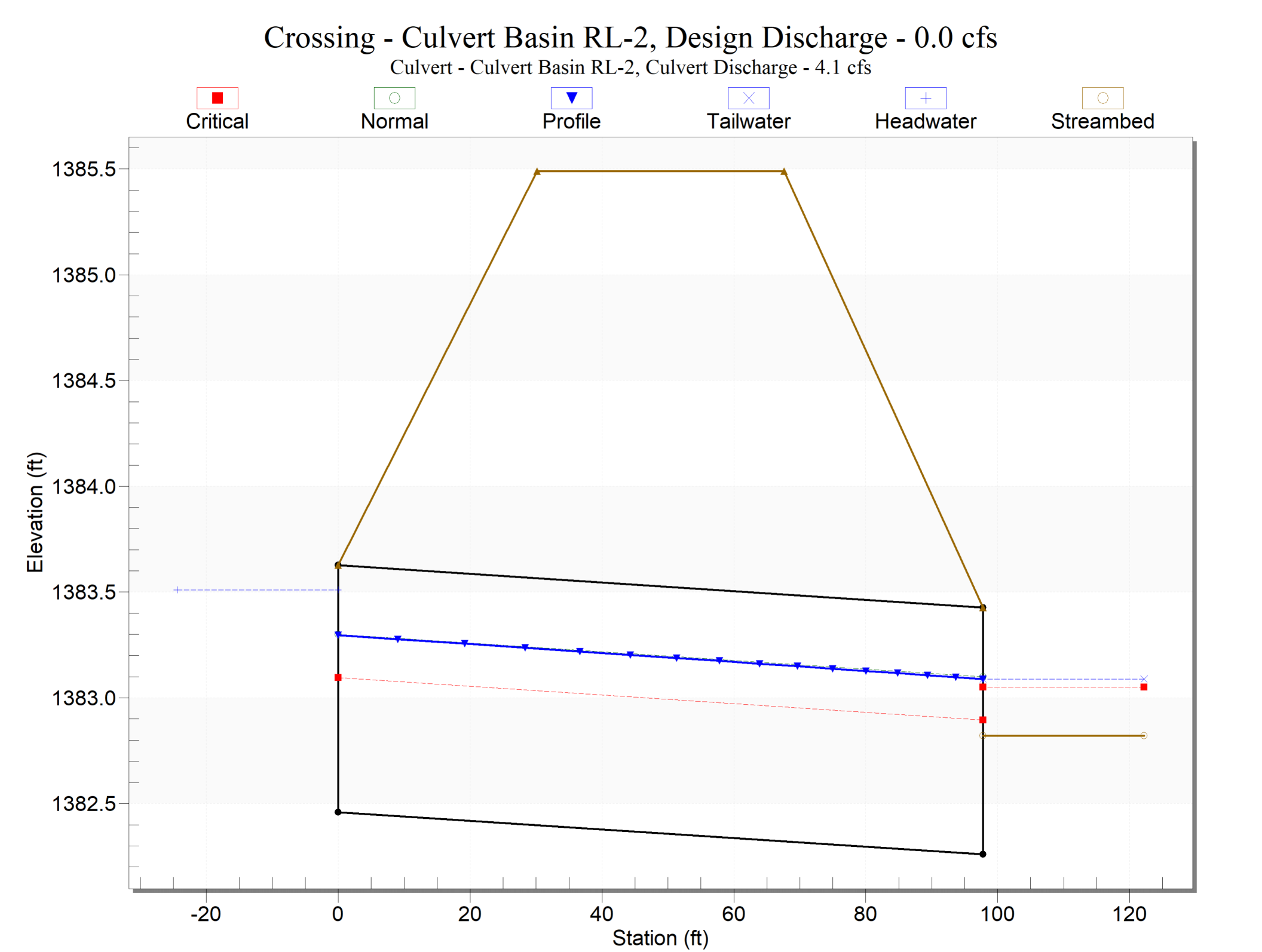
Culvert Summary Table - Culvert Basin RL-2

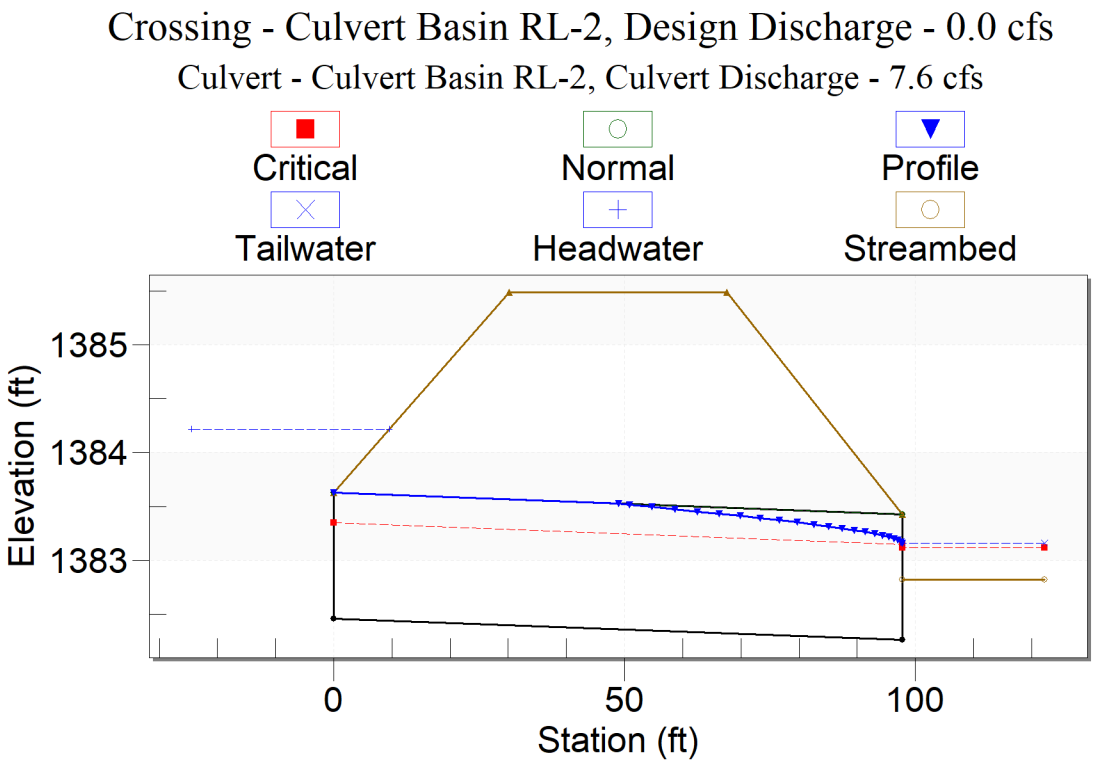
Storm Event	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5-Year	3.10	3.10	1383.36	0.78	0.90	3-M1t	0.69	0.54	0.80	0.24	2.40	1.32
10-Year	4.10	4.10	1383.51	0.93	1.05	3-M2t	0.84	0.63	0.83	0.27	3.06	1.42
100-Year	7.60	7.60	1384.22	1.48	1.76	7-M2t	1.17	0.89	0.90	0.34	5.21	1.66

Crossing - Culvert Basin RL-2, Design Discharge - 0.0 cfs

Culvert - Culvert Basin RL-2, Culvert Discharge - 3.1 cfs




Crossing - Culvert Basin RL-2, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RL-2, Culvert Discharge - 4.1 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
1385.5
1385.0
1384.5
1384.0
1383.5
1383.0
1382.5
Elevation (ft)
-20
0
20
40
60
80
100
120
Station (ft)

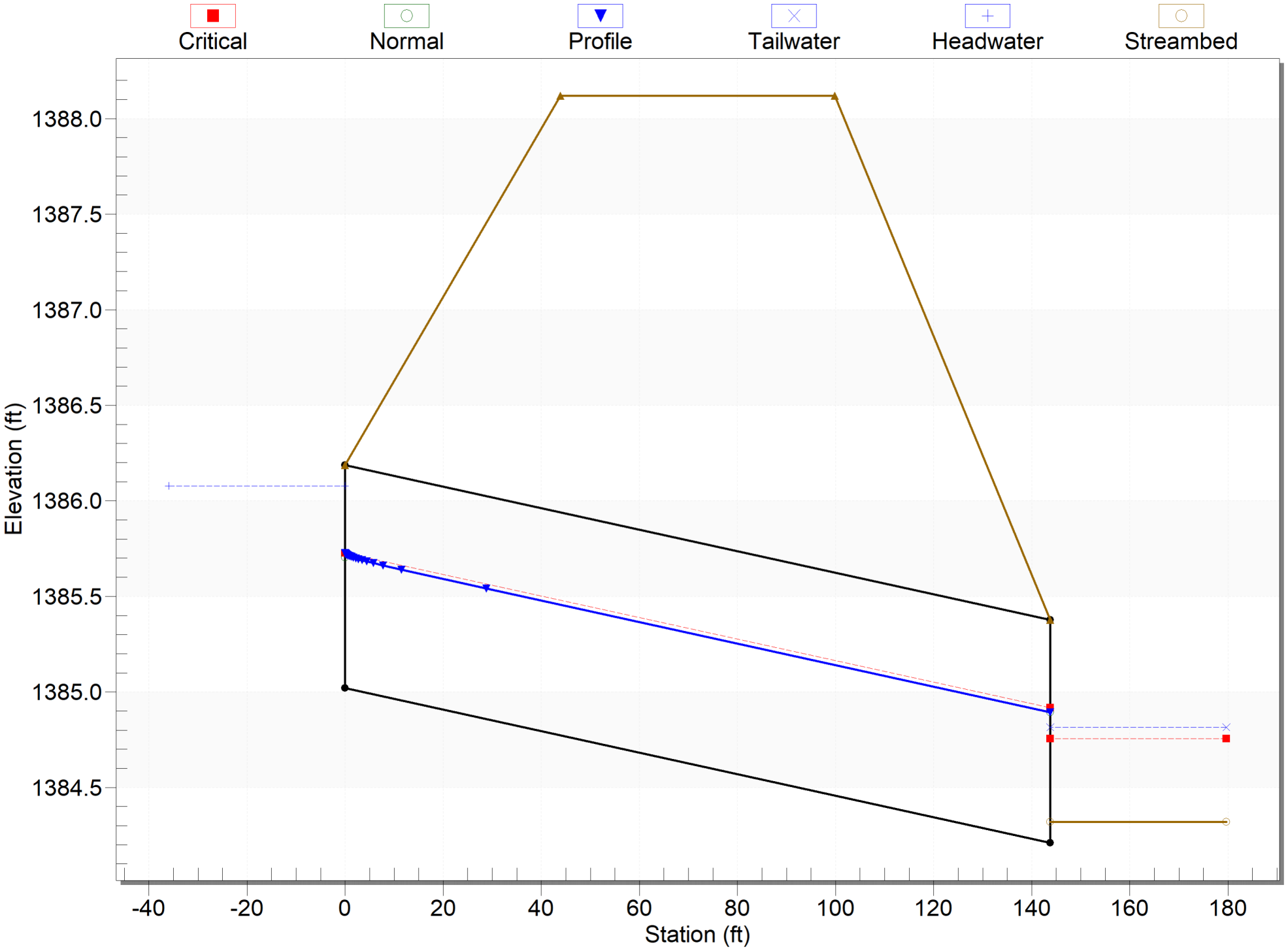

Crossing - Culvert Basin RL-2, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RL-2, Culvert Discharge - 7.6 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
Elevation (ft)
1385
1384
1383
0
50
100
Station (ft)

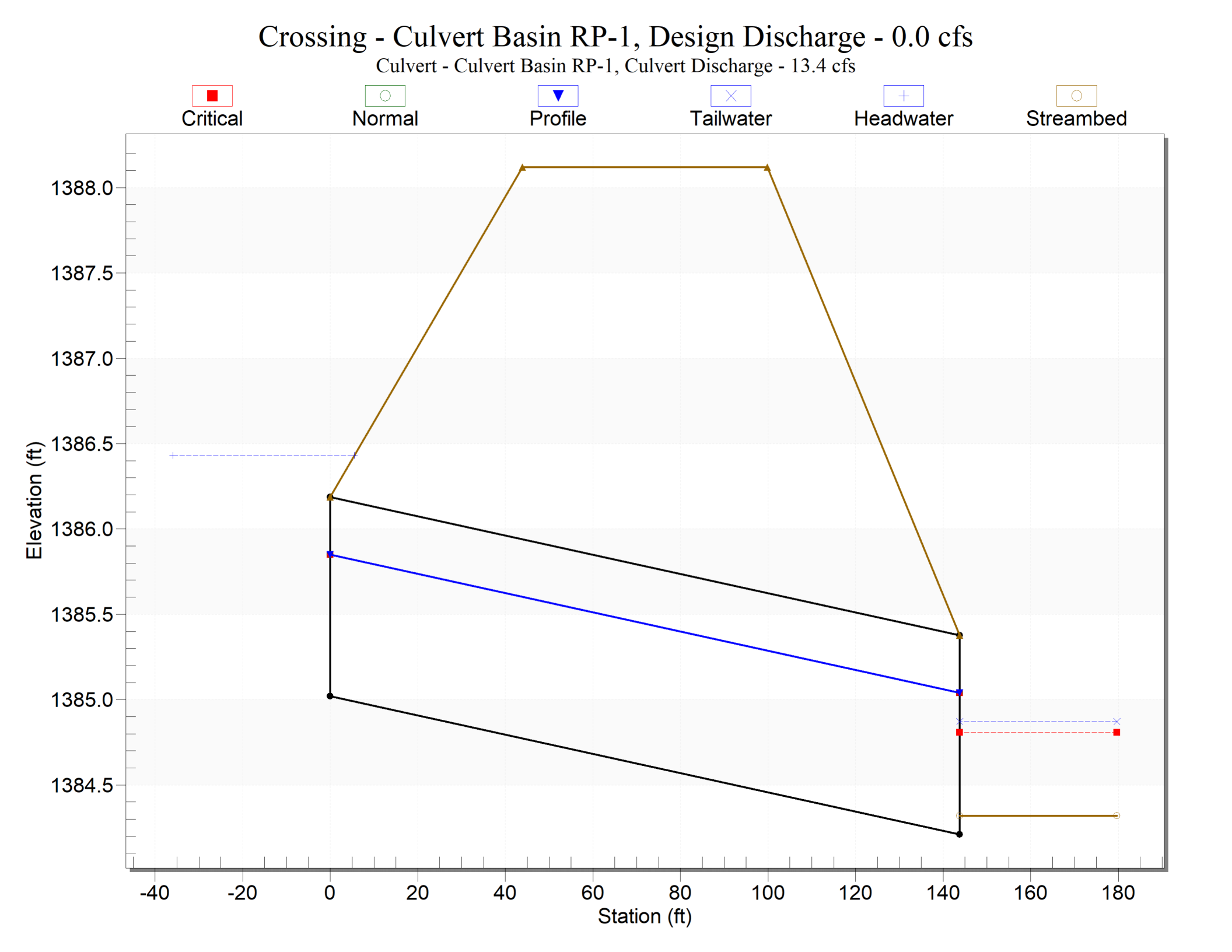
Culvert Summary Table - Culvert Basin RP-1

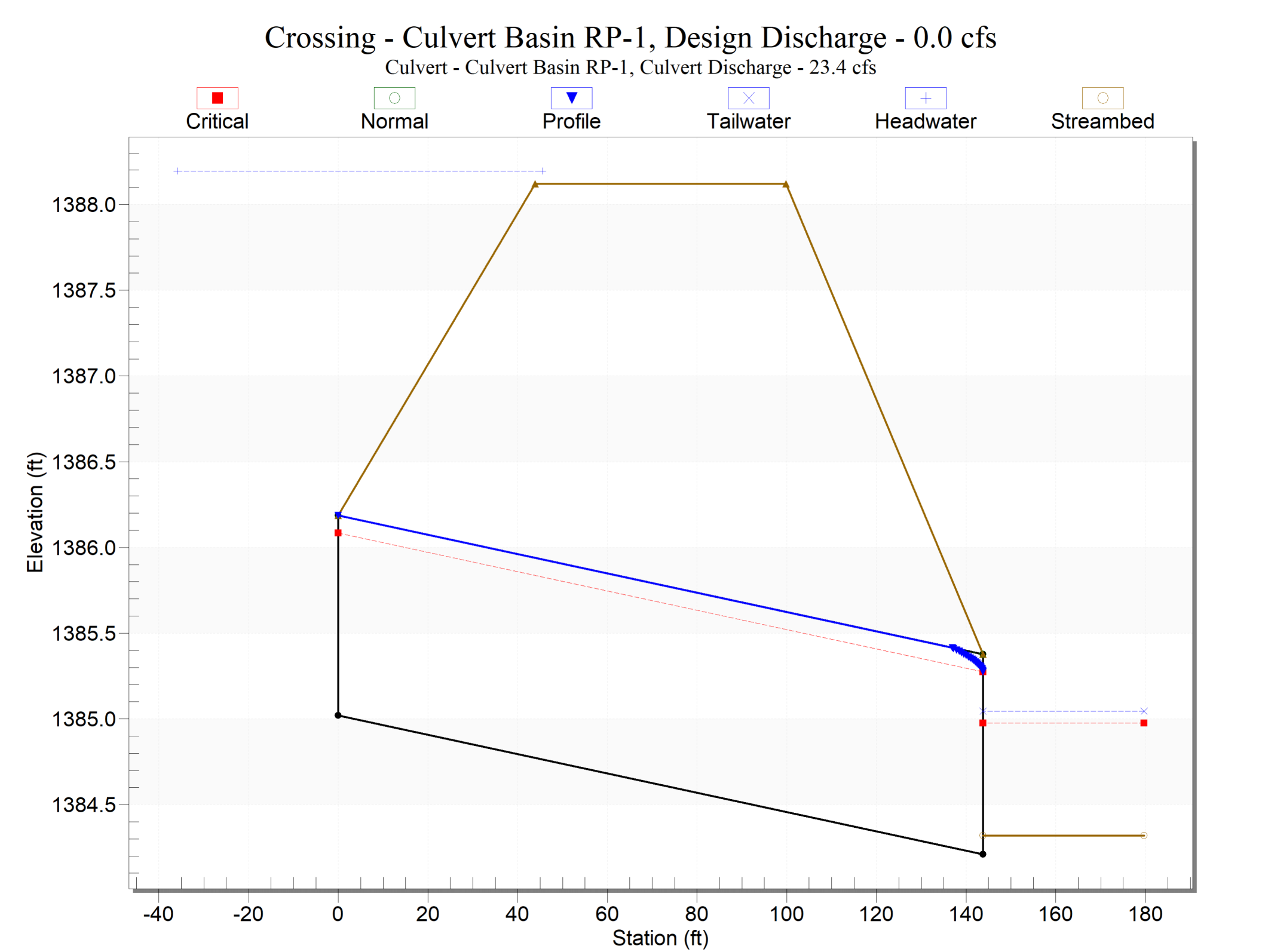
Storm Event	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5-Year	10.00	10.00	1386.08	1.06	0.42	1-S2n	0.68	0.71	0.68	0.49	4.64	2.05
10-Year	13.40	13.40	1386.43	1.32	1.41	7-M2c	0.83	0.83	0.83	0.55	4.99	2.21
100-Year	27.90	23.40	1388.19	2.41	3.17	7-M2c	1.17	1.06	1.06	0.73	6.89	2.65

Crossing - Culvert Basin RP-1, Design Discharge - 0.0 cfs

Culvert - Culvert Basin RP-1, Culvert Discharge - 10.0 cfs




Crossing - Culvert Basin RP-1, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RP-1, Culvert Discharge - 13.4 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
Elevation (ft)
1388.0
1387.5
1387.0
1386.5
1386.0
1385.5
1385.0
1384.5
-40
-20
0
20
40
60
80
100
120
140
160
180
Station (ft)

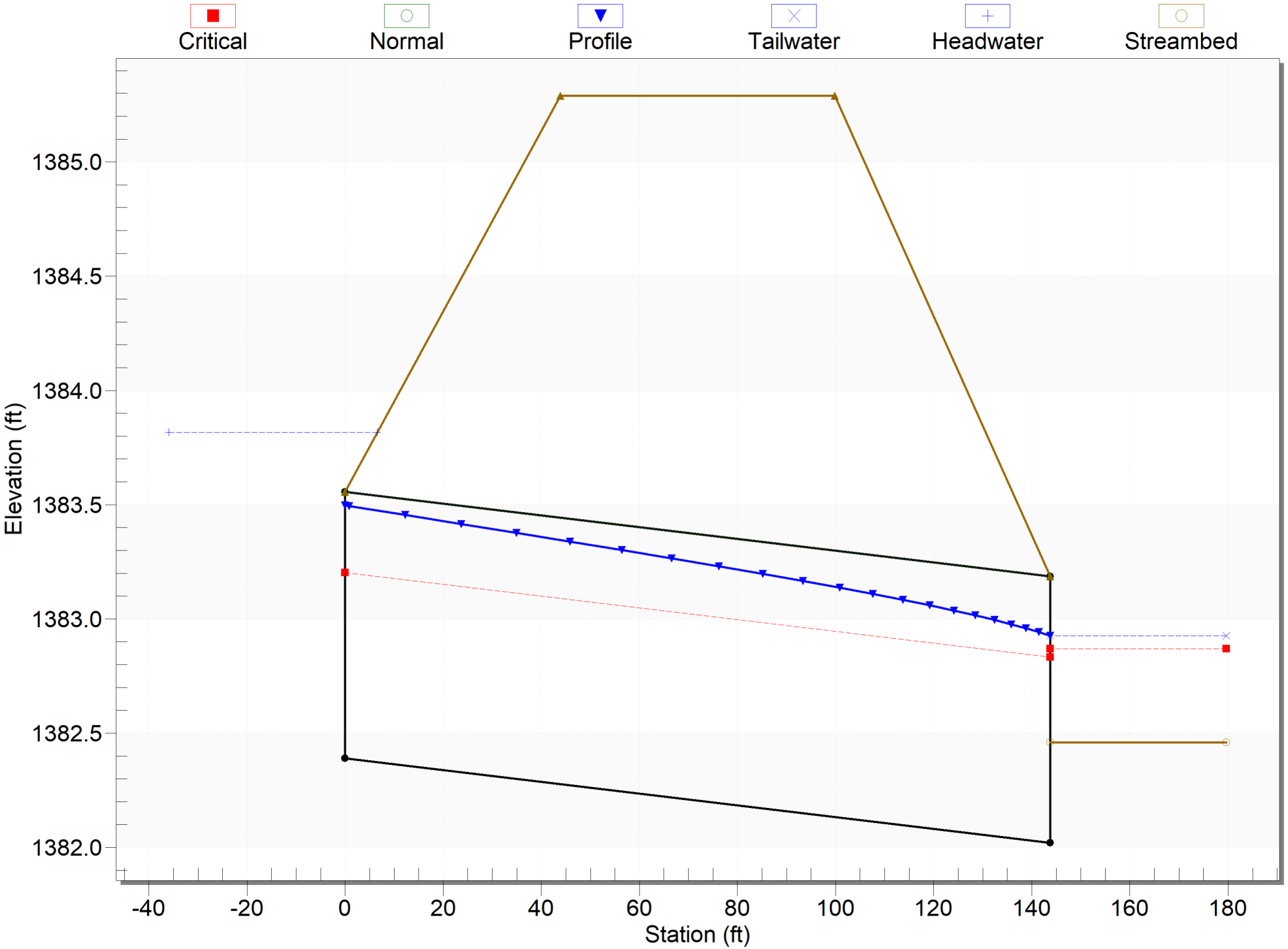

Crossing - Culvert Basin RP-1, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RP-1, Culvert Discharge - 23.4 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
Elevation (ft)
1388.0
1387.5
1387.0
1386.5
1386.0
1385.5
1385.0
1384.5
-40
-20
0
20
40
60
80
100
120
140
160
180
Station (ft)

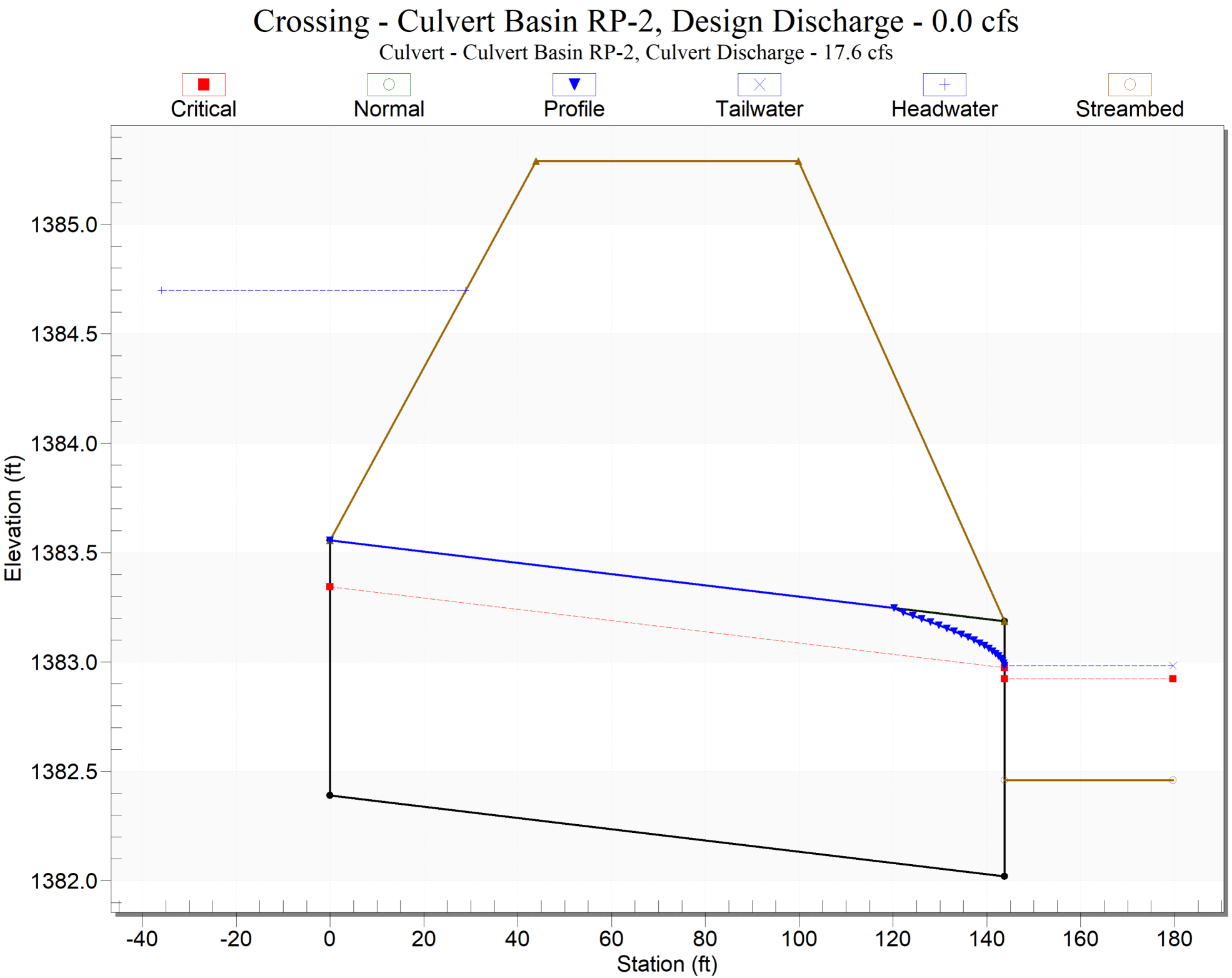
Culvert Summary Table - Culvert Basin RP-2

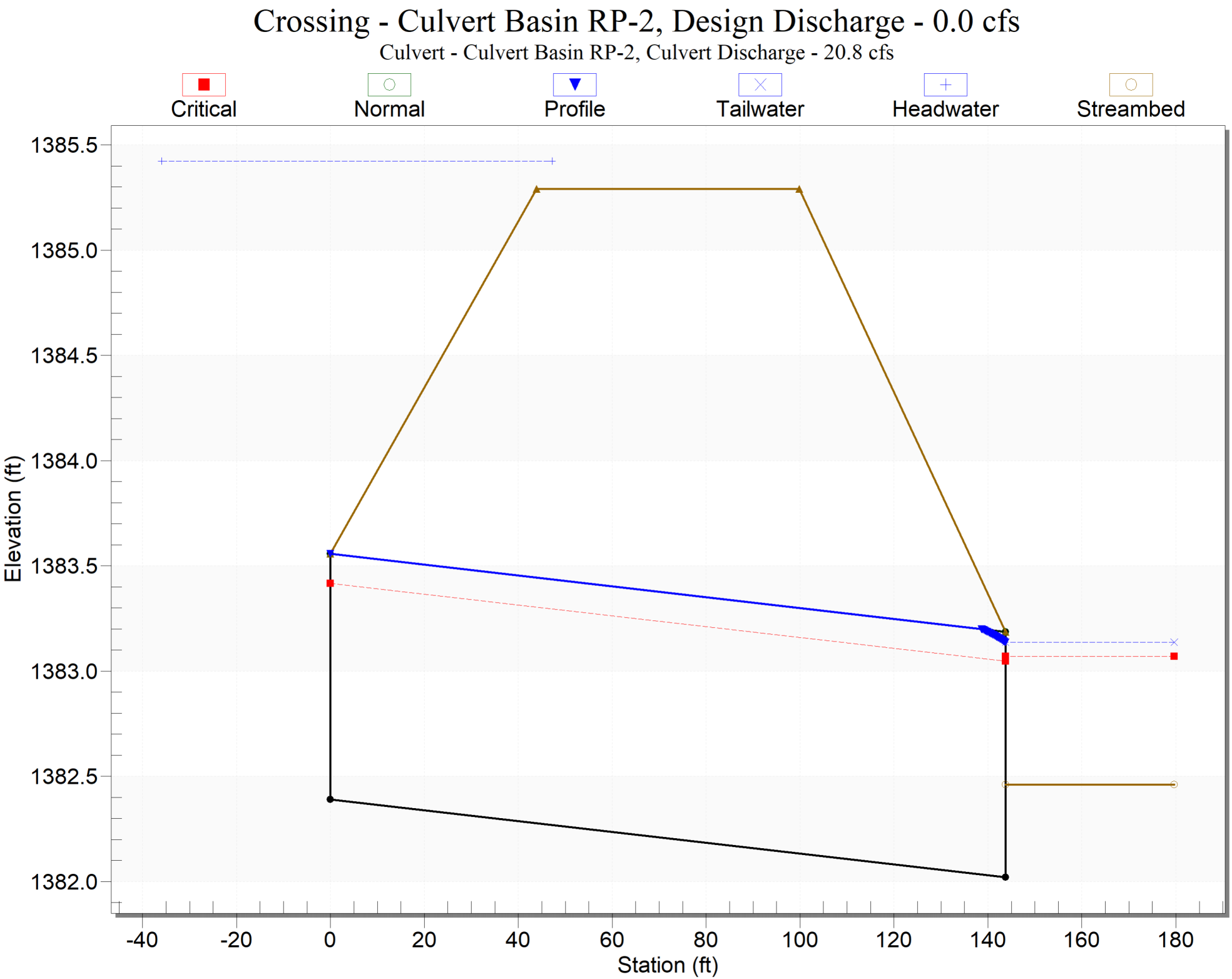
Storm Event	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
5-Year	12.90	12.90	1383.82	1.28	1.43	3-M2t	1.17	0.81	0.91	0.47	4.38	1.98
10-Year	17.60	17.60	1384.70	1.71	2.31	7-M2t	1.17	0.95	0.96	0.52	5.63	2.14
100-Year	34.90	20.84	1385.42	2.08	3.03	7-M2t	1.17	1.03	1.12	0.68	5.95	2.54

Crossing - Culvert Basin RP-2, Design Discharge - 0.0 cfs

Culvert - Culvert Basin RP-2, Culvert Discharge - 12.9 cfs




Crossing - Culvert Basin RP-2, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RP-2, Culvert Discharge - 17.6 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
Elevation (ft)
1385.0
1384.5
1384.0
1383.5
1383.0
1382.5
1382.0
-40
-20
0
20
40
60
80
100
120
140
160
180
Station (ft)


Crossing - Culvert Basin RP-2, Design Discharge - 0.0 cfs
Culvert - Culvert Basin RP-2, Culvert Discharge - 20.8 cfs
Critical
Normal
Profile
Tailwater
Headwater
Streambed
Elevation (ft)
1385.5
1385.0
1384.5
1384.0
1383.5
1383.0
1382.5
1382.0
-40
-20
0
20
40
60
80
100
120
140
160
180
Station (ft)

		VELOCITY	
3 (14"x23")	RL-1	5.43	ft/s
(14"x23")	RL-2	3.06	ft/s
2 (14"x23")	RP-1	4.99	ft/s
2 (14"x23")	RP-2	5.63	ft/s

SG = 2.50

SG*62.4

Specific Weight of Stone = 156.0 lb/ft^3

Specific weight of Water = 62.4 lb/ft^3

Channel Bed on Sttraight reach

$$d_{50} = 0.0191 V_a^2 \left(\frac{\gamma_w}{\gamma_s - \gamma_w} \right)$$

RL-1	d_{50} =	0.38	ft	4.51 in
RL-2	d_{50} =	0.12	ft	1.43 in
RP-1	d_{50} =	0.32	ft	3.80 in
RP-2	d_{50} =	0.40	ft	4.84 in

Use d_{50} = 6 in

TABLE 8.6
APRON LENGTH AND THICKNESS
(USDOT, 2006)

d_{50} (in)	Apron Length (L, ft)	Apron Thickness (ft)
5	4D	3.5 d_{50}
6	4D	3.3 d_{50}
10	5D	2.4 d_{50}
14	6D	2.2 d_{50}
20	7D	2.0 d_{50}
22	8D	2.0 d_{50}

The apron width at the outlet should be 3 times the diameter for a circular culvert or equivalent diameter for a non-circular culvert. The apron width at the apron downstream end can be estimated by $3D + 2L/3$ where D is the diameter or equivalent diameter and L is the apron length.

The apron shall have a filter beneath the riprap. The filter can be a fabric filter or granular filter. Refer to Riprap Layer Characteristics in Section 6.6.3 for the filter design procedure.

Culvert RL-1 Riprap

Culvert		D (Diameter) (ft)	d_{50} (ft)		Use minimium dimensions
Length (ft) =	4D	1.50		6.00 ft	6 ft
Thickness(ft) =	$3.3d_{50}$		0.50	1.65 ft	2 ft
Width Upstream ft) =	3D			4.50 ft	5 ft
Width (down stream) =	3D+2L/3			8.50 ft	9 ft

Culvert RL-2 Riprap

Culvert		D (Diameter) (ft)	d_{50} (ft)		Use minimium dimensions
Length (ft) =	4D	1.50		6.00 ft	6 ft
Thickness(ft) =	$3.3d_{50}$		0.50	1.65 ft	2 ft
Width Upstream ft) =	3D			4.50 ft	5 ft
Width (down stream) =	3D+2L/3			8.50 ft	9 ft

Culvert RP-1 Riprap

Culvert		D (Diameter) (ft)	d_{50} (ft)		Use minimium dimensions
Length (ft) =	4D	1.50		6.00 ft	6 ft
Thickness(ft) =	$3.3d_{50}$		0.50	1.65 ft	2 ft
Width Upstream ft) =	3D			4.50 ft	5 ft
Width (down stream) =	3D+2L/3			8.50 ft	9 ft

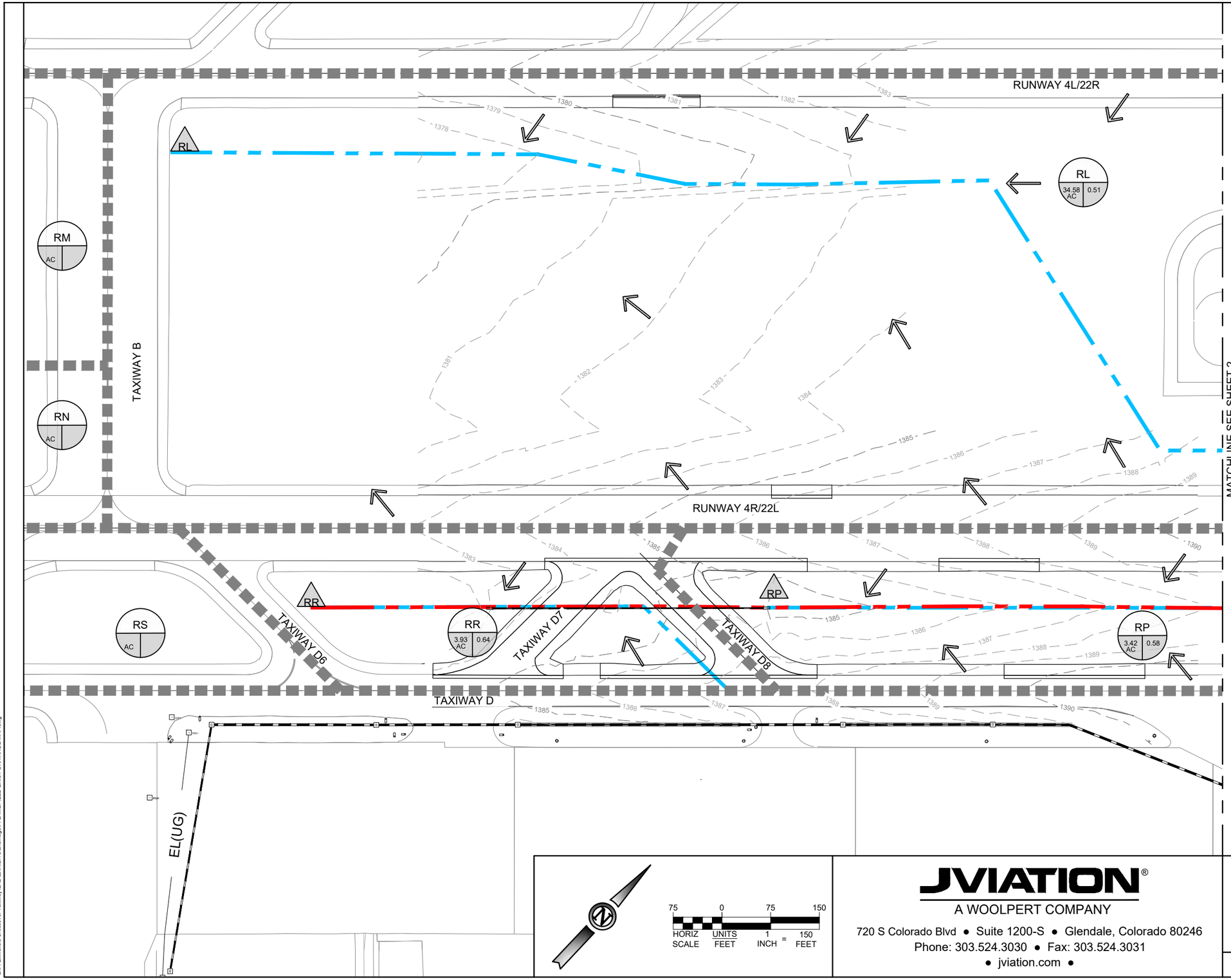
Culvert RP-2 Riprap

Culvert		D (Diameter) (ft)	d_{50} (ft)		Use minimium dimensions
Length (ft) =	4D	1.50		6.00 ft	6 ft
Thickness(ft) =	$3.3d_{50}$		0.50	1.65 ft	2 ft
Width Upstream ft) =	3D			4.50 ft	5 ft
Width (down stream) =	3D+2L/3			8.50 ft	9 ft

APPENDIX E

Existing Drainage Maps

Proposed Drainage Maps



LEGEND

- A1 / 0.23 AC / 0.65 — BASIN ID; BASIN 5 YEAR COEFFICIENT; BASIN AREA IN ACRES
- A1 — CONCENTRATION POINT
- BASIN FLOW ARROW
- EXISTING BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY
- TIME OF CONCENTRATION FLOWPATH
- CONVEYANCE ROUTE

EXISTING FLOW DIAGRAM WITHIN PROJECT AREA

EXISTING OUTFALL BASIN RM — RL

EXISTING OUTFALL BASIN RS — RR — RP — RO

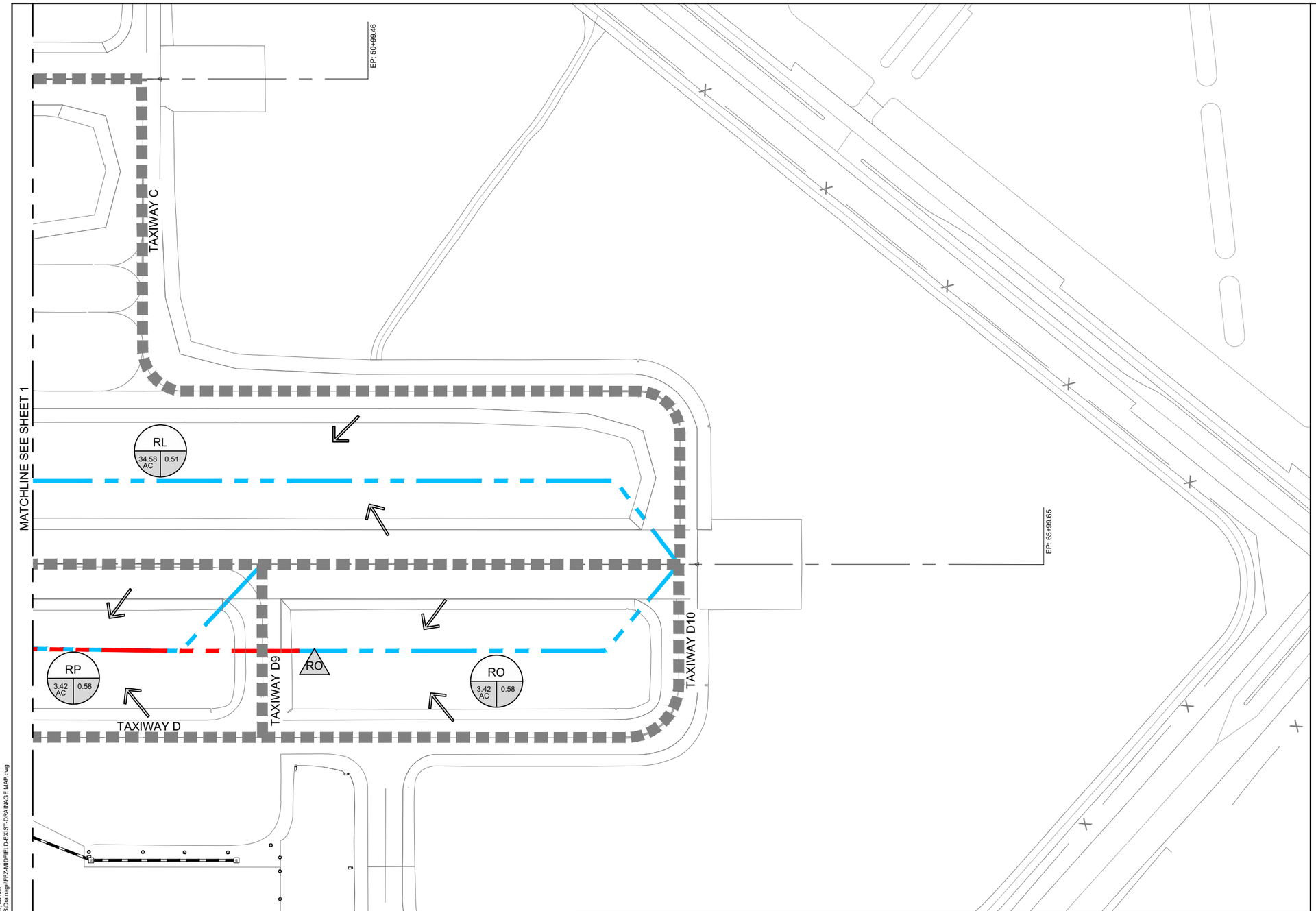
75 0 75 150
HORIZ SCALE UNITS FEET 1 INCH = 150 FEET

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FALCON FIELD AIRPORT
CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8
PROPOSED DRAINAGE MAP

SHEET 1 OF 2

Plotted: January 24, 2023 @ 9:40 AM by: Meshaal, James
L:\FFZ\Midfield Crossover Taxiway\CAD\EXHIBITS\Drainage\FFZ-MIDFIELD-EXIST-DRAINAGE MAP.dwg



LEGEND

- A1 / 0.23 AC / 0.65 — BASIN ID; BASIN 5 YEAR COEFFICIENT; BASIN AREA IN ACRES
- A1 — CONCENTRATION POINT
- BASIN FLOW ARROW
- EXISTING BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY
- TIME OF CONCENTRATION FLOWPATH
- CONVEYANCE ROUTE

EXISTING FLOW DIAGRAM WITHIN PROJECT AREA

EXISTING OUTFALL BASIN RM — RL

EXISTING OUTFALL BASIN RS — RR — RP — RO

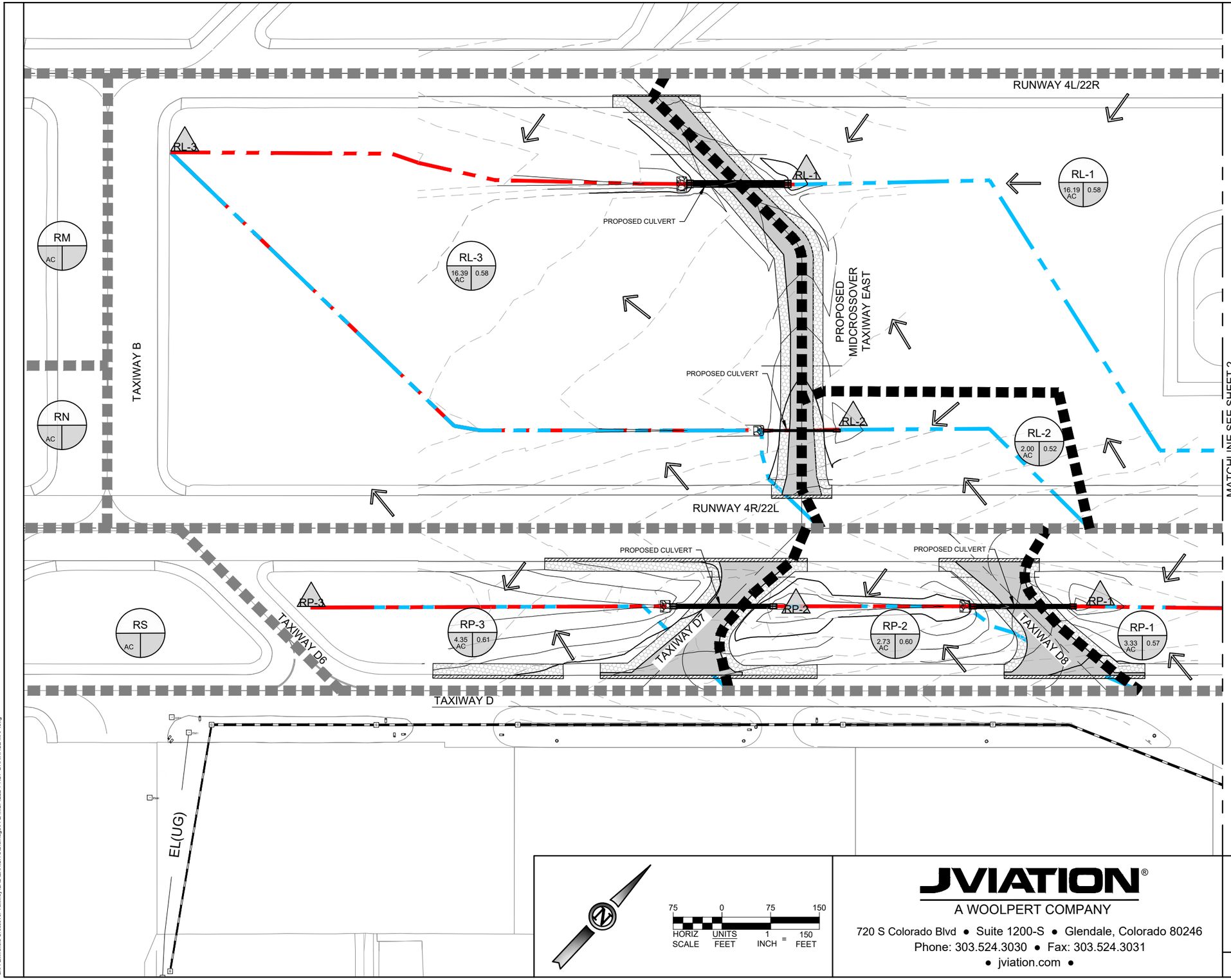
75 0 75 150
HORIZ SCALE UNITS FEET 1 INCH = 150 FEET

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FALCON FIELD AIRPORT
CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8
PROPOSED DRAINAGE MAP

SHEET 2 OF 2

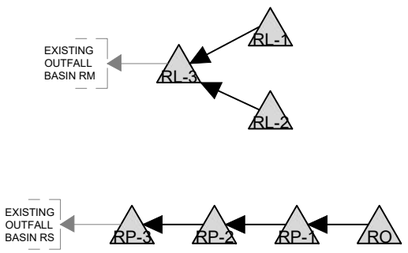
Plotted: January 24, 2020 @ 9:40 AM by: Moorhead, James
L:\FFZ\Midfield Crossover Taxiway\CAD\EXHIBITS\Drainage\FFZ-MIDFIELD-EXIST-DRAINAGE MAP.dwg



LEGEND

- A1 — BASIN ID
- 0.23 AC / 0.65 — BASIN 5 YEAR COEFFICIENT
- BASIN AREA IN ACRES
- A1 — CONCENTRATION POINT
- BASIN FLOW ARROW
- EXISTING BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY
- TIME OF CONCENTRATION FLOWPATH
- CONVEYANCE ROUTE

PROPOSED FLOW DIAGRAM WITHIN PROJECT AREA



75 0 75 150
HORIZ SCALE UNITS FEET 1 INCH = 150 FEET

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FALCON FIELD AIRPORT
CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8
PROPOSED DRAINAGE MAP

SHEET 1 OF 2

Plotted: January 24, 2023 @ 10:02 AM by: Morehead, James
L:\FFZ\Midfield Crossover Taxiway\CAD\EXHIBITS\Drainage\FFZ-MIDFIELD-PROP-DRAINAGE MAP.dwg

EP: 50+99.46

TAXIWAY C

MATCHLINE SEE SHEET 1

RL-1
16.19 AC | 0.58

RP-1
3.33 AC | 0.57

RO

RO
3.42 AC | 0.58

TAXIWAY D9

TAXIWAY D10

TAXIWAY D

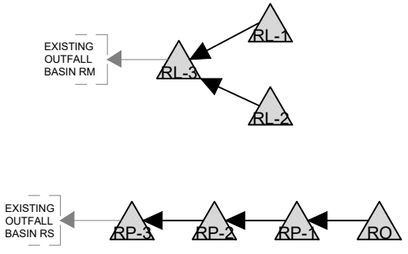
EP: 65+99.65

ANZIO TAXILANE

LEGEND

- A1 — BASIN ID
- 0.23 AC | 0.65 — BASIN 5 YEAR COEFFICIENT
- BASIN AREA IN ACRES
- A1 — CONCENTRATION POINT
- BASIN FLOW ARROW
- EXISTING BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY
- TIME OF CONCENTRATION FLOWPATH
- CONVEYANCE ROUTE

PROPOSED FLOW DIAGRAM WITHIN PROJECT AREA



75 0 75 150
HORIZ SCALE UNITS FEET 1 INCH = 150 FEET

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FALCON FIELD AIRPORT
CONSTRUCT MIDFIELD CROSSOVER TAXIWAY EAST AND REALIGNMENT OF TAXIWAYS D7 AND D8
PROPOSED DRAINAGE MAP

SHEET 2 OF 2

Plotted: January 24, 2023 @ 10:02 AM by: Morehead, James
L:\FFZ\Midfield Crossover Taxiway (CAD)\EXHIBITS\Drainage\FFZ-MIDFIELD-PROP-DRAINAGE MAP.dwg