

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE OF PAGES 4
2. AMENDMENT/MODIFICATION NO. AM-0001	3. EFFECTIVE DATE 06/7/01	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)	
6. ISSUED BY CODE	7. ADMINISTERED BY (If other than Item 6) CODE			
US ARMY ENGINEER DISTRICT, HONOLULU CORPS OF ENGINEERS, BUILDING S-200 FORT SHAFTER, HAWAII 96858-5440 CONTRACT SPECIALIST: RENEE M. HICKS				

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)	<input checked="" type="checkbox"/> 9A. AMENDMENT OF SOLICITATION NO. DACA83-01-B-0003
	9B. DATED (SEE ITEM 11) 05/11/01
	10A. MODIFICATION OF CONTRACT/ORDER NO.
CODE	FACILITY CODE
10B. DATED (SEE ITEM 13)	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. Accounting and Appropriation Data (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc). SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
FY01 MCP KNMD983001, UPGRADE HANGAR COMPLEX, HICKAM AIR FORCE BASE, OAHU, HAWAII

(See Page 2 of 2 Pages)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF SIGNER (Type or print)
15B. CONTRACTOR/OFFEROR <i>(Signature of person authorized to sign)</i>	16B. UNITED STATES OF AMERICA BY _____ <i>(Signature of Contracting Officer)</i>
15C. DATE SIGNED	16C. DATE SIGNED

1. CHANGES TO THE SOLICITATION. Attached hereto are changes to the solicitation.

REVISIONS. The following sections have been revised:

Section 00700 - 52.211-12 "LIQUIDATED DAMAGES--CONSTRUCTION"

DELETIONS. The following clauses/provisions are deleted from the solicitation:

Section 00010 - BIDDING SCHEDULE

Section 00700 - 52.219-14 "LIMITATIONS ON SUBCONTRACTING (DEC 1996)"

Section 00800 - S-14 "PRICE ADJUSTMENT FOR CONTINGENT SCOPE OF WORK"

ADDITIONS. The following clauses/provisions are added to the solicitation:

Section 00010 - BIDDING SCHEDULE

Section 00700 - 52.219-4 "NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999)"

Section 00800 - S-36.10 "WARRANTY IMPLEMENTATION"

2. CHANGES TO DIVISION 1 SPECIFICATIONS. Attached hereto are revised paragraphs/pages to the specifications. The revision mark (Am-0001) is shown on each page. The following are revised pages and paragraphs to the specification:

REVISED PAGES/PARAGRAPHS: Following are revised pages/paragraphs to the specifications. Changes are indicated in bold. The following are revised pages/paragraphs to the specification:

Section 13206: Paragraph 2.3

Section 13851: Paragraphs 3.4 and 3.4.1

3. CHANGES TO THE DRAWINGS.

A. REVISED DRAWINGS (NOT ISSUED): Following are revisions made to the drawings listed. These revised drawings will not be issued with this amendment but will be furnished to the successful bidder at the time of award of the contract:

Drawing No. 211-12-05, Sheet S2.9, Ring No. 53, Zones B3 and D3:

Delete AWWA D-103-97 Type 6 Foundation shown on Details 2/S2.9/S2.9, and 3/S2.9/S2.9 and construct foundations as required by the specification 13206 Section 3.1".

Drawing No. 211-12-05, Sheet M0.0, Ring No. 61, Zone D1:

Delete the word "return" and replace with "retain".

Drawing No. 211-12-05, Sheet M0.0, Ring No. 61, Zone D1:

Add the following notes to the Fire Sprinkler System Notes:

"19. All new deluge piping shall be coated to match the same color as the existing piping.

20. All new wet pipe and pre-action fire sprinkler piping shall be painted to match the existing hangar color scheme even if the piping is galvanized or corrosion resistant."

Drawing No. 211-12-05, Sheet M1.0, Ring 62, Zone C2 and D2:

Delete the outline of the new tank. This tank shall be provided under the additive bid option only.

Drawing No. 211-12-05, Sheet M5.0, Ring 103, Zone A4 and A5:

Add the following note:

"5. The existing deluge sprinkler piping supports shall be re-used. Provide additional seismic sway bracing on the existing deluge sprinkler piping to comply with the latest NFPA 13 requirements and Section 15070 of the specifications.

- B. REVISED SECTIONS OF THE DRAWINGS (ISSUED AS SKETCHES): Following are revisions made to the drawings listed. They are provided with this amendment as sketches. These revised drawings will not be issued with this amendment but will be furnished to the successful bidder at the time of award of the contract.

<u>SKETCH NO.</u>	<u>DWG.NO.</u>	<u>SHEET NO.</u>	<u>RING NO.</u>	<u>REV. LTR.</u>	<u>REV. DATE</u>
SKM-1	211-12-05	T1.0	1	A	25 May 01
Am-0001: DELETED note #9 from general notes.					
SKM-2	211-12-05	M5.2	105	A	25 May 01
Am-0001: ADDED location of trouble alarm panel for trap pit sump pumps.					
SKM-3	211-12-05	M5.2	105	A	25 May 01
Am-0001: ADDED note regarding cable/air hoses					
SKM-4	211-12-05	M2.15	84	A	25 May 01
Am-0001: REVISED detail 7/M2.15.					
SKM-5	211-12-05	M8.0	119	A	25 May 01
Am-0001: REVISED Deluge riser Surge Arrestor Schedule.					
SKM-6	211-12-05	M6.0	106	A	25 May 01
Am-0001: REVISED Hangar Section to show compressed air piping.					

AM-0001
IFB No. DACA83-01-B-0003
Item 14 (Continued)

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SKM-7 211-12-05 M7.5 118 A 25 May 01
Am-0001: REVISED compressed air piping support detail.

SKM-8 211-12-05 M7.5 118 A 25 May 01
AM-0001: REVISED compressed air piping diagram

4. The bid opening date of June 11, 2001, is hereby extended to June 18, 2001, 2:00 P.M., Hawaiian Standard Time.

SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair)	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACA83-01-B-0003	<input checked="" type="checkbox"/> SEALED BID (IFB) <input type="checkbox"/> NEGOTIATED (RFP)	05/11/01	1 6

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

7. ISSUED BY U.S. Army Corps of Engineers Honolulu Engineer District Building 230 Fort Shafter, Hawaii 96858-5440	CODE	8. ADDRESS OFFER TO U.S. Army Corps of Engineers Honolulu Engineer District Building 200, Construction/A-E Contracts Branch Fort Shafter, Hawaii 96858-5440
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9. FOR INFORMATION CALL:	a. NAME Renee M. Hicks	b. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) (808) 438-8567
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SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying no., date)

FY01MCP KNMD983001, UPGRADE HANGAR COMPLEX, HICKAM AIR FORCE BASE, OAHU, HAWAII
(SEE MAIN TOC)

11. The Contractor shall begin performance 7 calendar days and complete it 380 calendar days after receiving award, notice to proceed. This performance period mandatory negotiable. (See 52.211-10, Section 00700 .)

12a. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? (If "YES," indicate within how many calendar days after award in Item 12b). <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	12b. CALENDAR DAYS 14
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13. ADDITIONAL SOLICITATION REQUIREMENTS:

- a. Sealed offers in original 1 copies to perform the work required are due at the place specified in Item 8 2:00 p.m. (hour) local time *06/18/01 (HST)* (date). If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.
- b. An offer guarantee is, is not required.
- c. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by
- d. Offers providing less than 120 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

Invitation for Bids No. DACA83-01-B-0003

SECTION 00010
BIDDING SCHEDULE

UPGRADE HANGAR COMPLEX
HICKAM AIR FORCE BASE
OAHU, HAWAII

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	AMOUNT
<u>BASE SCHEDULE</u>				
1.	Upgrade Hangar Complex	1	JOB	\$ _____
TOTAL BASE SCHEDULE				\$ _____

OPTIONS

- | | | | |
|---|---|-----|----------|
| 2. 1-Hour Separation Between Hangars 34 and 35 (Option No. 1) | 1 | JOB | \$ _____ |
| 3. 1-Hour Separation Between Center Office Module and the Adjacent Hangar 35 Area (Aircraft Docks) (Option No. 2) | 1 | JOB | \$ _____ |
| 4. Upgrade Hangar 35 Electrical Systems (Option No. 3) | 1 | JOB | \$ _____ |
| 5. Compressed Air and Electrical Cable Utility Trenches in Hangar 35 (Option No. 4) | 1 | JOB | \$ _____ |
| 6. New Water Storage Tank (Option No. 5) | 1 | JOB | \$ _____ |

TOTAL **OPTIONS** \$ _____

TOTAL BASE SCHEDULE PLUS **OPTIONS** \$ _____

THE FOLLOWING WILL BE COMPLETED BY THE CONTRACTING OFFICER UPON AWARD:

TOTAL AWARD AMOUNT (Base Schedule plus **Options** Nos. _____) \$ _____

NOTES TO BIDDING SCHEDULE:

1. By submission of an offer under the **OPTION**, Bidder agrees that the Government may exercise the **OPTION** at the time of award, or at any time within 30 days following the date of the award of the basic contract. (See Provision No. 52.217-5, EVALUATIONS OF OPTIONS, in Section 00100).

2. Failure to bid on all the items in the Bidding Schedule may cause the bid to be considered nonresponsive.

PAYMENT(S)

Compensation for all work to be performed under this contract will be made under the payment item(s) listed herein. The principal features of the work to be included under the payment item(s) are noted. Work required by the drawings and specifications and not particularly mentioned shall be included in and be paid for under the contract price for the item to which the work pertains. Price(s) and payment(s) for the item(s) shall cover all work, complete and finished in accordance with the specifications, schedules, and drawings, and shall be full compensation for all work in connection therewith, including quality control and cost of performance-and payment-bond premiums as specified in the CONTRACT CLAUSES. Price(s) and payment(s) shall constitute full and final compensation for furnishing all materials, equipment, management, supervision, labor, transportation, fuel, power, water, and all incidental items necessary to complete the work, except as otherwise specified to be furnished by the Government. For the purpose of CONTRACT CLAUSE entitled "PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS", the term "designated billing office" and "designated payment office" are as follows:

a. Billing Office

U.S. Army Engineer District, Honolulu
Fort Shafter Resident Office, Bldg. 230
Fort Shafter, HI 96858-5440

b. Payment Office

U.S. Army Engineer District, Honolulu
Attn.: Accounts Payable Branch (CEPOH-RM-FA), Bldg. 230
Fort Shafter, HI 96858-5440

Item numbers mentioned herein after correspond to the item numbers in the BIDDING SCHEDULE.

a. Item No. 1, UPGRADE HANGAR COMPLEX, will be paid for at the contract price, complete in place and ready for use, including retrofitting the existing deluge system serving Hangar 35, providing a new wet pipe fire sprinkler system throughout Hangar 34, replacing the fire alarm system throughout the building, including all related work, testing, final connections, cleanup, and all incidental items necessary to complete the work.

b. Item No. 2, 1-HOUR SEPARATION BETWEEN HANGARS 34 AND 35 (Option No. 1), will be paid for at the contract price, complete in place and ready for use, including all architectural work, related mechanical and electrical work, final connections, cleanup, and all incidental items necessary to complete the work.

c. Item No. 3, 1-HOUR SEPARATION BETWEEN CENTER OFFICE MODULE AND THE ADJACENT HANGAR 35 AREA (AIRCRAFT DOCKS) (Option No. 2), will be paid for at the contract price, complete in place and ready for use, including all associated architectural work, mechanical ventilation upgrade, electrical improvements, testing, final connections, cleanup, and all incidental items necessary to complete the work.

d. Item No. 4, UPGRADE HANGAR 35 ELECTRICAL SYSTEMS (Option No. 3), will be paid for at the contract price, complete in place and ready for use, including all electrical retrofit work to upgrade existing electrical systems in Hangar 35, related testing, final connections, cleanup, and all incidental items necessary to complete the work.

e. Item No. 5, COMPRESSED AIR AND ELECTRICAL CABLE UTILITY TRENCHES IN HANGAR 35 (Option No. 4), will be paid for at the contract price, complete in place and ready for use, including all electrical retrofit work to upgrade existing electrical systems in Hangar 35, related testing, final connections, cleanup, and all incidental items necessary to complete the work.

f. Item No. 6, NEW WATER STORAGE TANK (Option No. 5), will be paid for at the contract price, complete in place and ready for use, including structural foundation work, piping connections and related piping, control work, tank structure, and all related appurtenances, level indicators and panels, testing, final connections, cleanup, and all incidental items necessary to complete the work.

- End of Section -

- 52.214-27 PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA--MODIFICATIONS--SEALED BIDDING (OCT 1997)
- 52.214-28 SUBCONTRACTOR COST OR PRICING DATA--MODIFICATIONS--SEALED BIDDING (OCT 1997)
- 52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 2000)
- 52.219-9 I SMALL BUSINESS SUBCONTRACTING PLAN (OCT 2000) - ALTERNATE I (OCT 2000)
- * ~~52.219-14 LIMITATIONS ON SUBCONTRACTING (DEC 1996) (DELETED) *~~
- 52.219-16 LIQUIDATED DAMAGES--SUBCONTRACTING PLAN (JAN 1999)
- 252.219-7003 SMALL, SMALL DISADVANTAGED AND WOMEN-OWNED SMALL BUSINESS SUBCONTRACTING PLAN (DOD CONTRACTS) (APR 1996)
- 52.222-3 CONVICT LABOR (AUG 1996)
- 52.222-4 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT --OVERTIME COMPENSATION (SEP 2000)
- 52.222-6 DAVIS-BACON ACT (FEB 1995)
- 52.222-7 WITHHOLDING OF FUNDS (FEB 1988)
- 52.222-8 PAYROLLS AND BASIC RECORDS (FEB 1988)
- 52.222-9 APPRENTICES AND TRAINEES (FEB 1988)
- 52.222-10 COMPLIANCE WITH COPELAND ACT REQUIREMENTS (FEB 1988)
- 52.222-11 SUBCONTRACTS (LABOR STANDARDS) (FEB 1988)
- 52.222-12 CONTRACT TERMINATION--DEBARMENT (FEB 1988)
- 52.222-13 COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS (FEB 1988)
- 52.222-14 DISPUTES CONCERNING LABOR STANDARDS (FEB 1988)
- 52.222-15 CERTIFICATION OF ELIGIBILITY (FEB 1988)
- 52.222-21 PROHIBITION OF SEGREGATED FACILITIES (FEB 1999)
- 52.222-26 EQUAL OPPORTUNITY (FEB 1999)
- 52.222-27 AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (FEB 1999)
- 52.222-35 AFFIRMATIVE ACTION FOR DISABLED VETERANS AND VETERANS OF THE VIETNAM ERA (APR 1998)
- 52.222-36 AFFIRMATIVE ACTION FOR WORKERS WITH DISABILITIES (JUN 1998)
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52.242-14 SUSPENSION OF WORK (APR 1984)

52.243-4 CHANGES (AUG 1987)

252.243-7001 PRICING OF CONTRACT MODIFICATIONS (DEC 1991)

252.243-7002 REQUESTS FOR EQUITABLE ADJUSTMENT (MAR 1998)

52.245-1 PROPERTY RECORDS (APR 1984)

52.246-12 INSPECTION OF CONSTRUCTION (AUG 1996)

52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

52.248-3 I VALUE ENGINEERING--CONSTRUCTION (FEB 2000) - ALTERNATE I (APR 1984)

52.249-2 I TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SEP 1996) -- ALTERNATE I (SEP 1996)

52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

52.253-1 COMPUTER GENERATED FORMS (JAN 1991)

* 52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999) *

APPENDIX A DAVIS BACON WAGE DETERMINATION

(AM-0001)

before entering into a subcontract with a party that is identified, on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, as being ineligible for the award of Defense contracts or subcontracts because it is owned or controlled by the government of a terrorist country. The notice must include the name of the proposed subcontractor notwithstanding its inclusion on the List of Parties Excluded From Federal Procurement and Nonprocurement Programs.

52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within 7 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 380 calendar days after notice to proceed with the work. The time stated for completion shall include final cleanup of the premises.

(End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

*(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of \$420.00 for each calendar day of delay until the work is completed or accepted. *

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of clause)

52.211-13 TIME EXTENSIONS (SEP 2000)

Time extensions for contract changes will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements related to the changed work and that the remaining contract completion dates for all other portions of the work will not be altered. The change order also may provide an equitable readjustment of liquidated damages under the new completion schedule.

(End of clause)

52.211-15 DEFENSE PRIORITY AND ALLOCATION REQUIREMENTS (SEP 1990)

This is a rated order certified for national defense use, and the Contractor shall follow all the requirements of the Defense Priorities and Allocations System regulation (15 CFR 700).

(End of clause)

52.214-26 AUDIT AND RECORDS--SEALED BIDDING. (OCT 1997)

(AM-0001)

(End of clause)

~~*52.219-14 — LIMITATIONS ON SUBCONTRACTING (DEC 1996) (DELETED)~~

~~(a) This clause does not apply to the unrestricted portion of a partial set-aside.~~

~~(b) By submission of an offer and execution of a contract, the Offeror/Contractor agrees that in performance of the contract in the case of a contract for--~~

~~(1) Services (except construction). At least 50 percent of the cost of contract performance incurred for personnel shall be expended for employees of the concern.~~

~~(2) Supplies (other than procurement from a nonmanufacturer of such supplies). The concern shall perform work for at least 50 percent of the cost of manufacturing the supplies, not including the cost of materials.~~

~~(3) General construction. The concern will perform at least 15 percent of the cost of the contract, not including the cost of materials, with its own employees.~~

~~(4) Construction by special trade contractors. The concern will perform at least 25 percent of the cost of the contract, not including the cost of materials, with its own employees. *~~

52.219-16 LIQUIDATED DAMAGES-SUBCONTRACTING PLAN (JAN 1999)

(a) Failure to make a good faith effort to comply with the subcontracting plan, as used in this clause, means a willful or intentional failure to perform in accordance with the requirements of the subcontracting plan approved under the clause in this contract entitled "Small Business Subcontracting Plan," or willful or intentional action to frustrate the plan.

(b) Performance shall be measured by applying the percentage goals to the total actual subcontracting dollars or, if a commercial plan is involved, to the pro rata share of actual subcontracting dollars attributable to Government contracts covered by the commercial plan. If, at contract completion or, in the case of a commercial plan, at the close of the fiscal year for which the plan is applicable, the Contractor has failed to meet its subcontracting goals and the Contracting Officer decides in accordance with paragraph (c) of this clause that the Contractor failed to make a good faith effort to comply with its subcontracting plan, established in accordance with the clause in this contract entitled "Small Business Subcontracting Plan," the Contractor shall pay the Government liquidated damages in an amount stated. The amount of probable damages attributable to the Contractor's failure to comply shall be an amount equal to the actual dollar amount by which the Contractor failed to achieve each subcontract goal.

(c) Before the Contracting Officer makes a final decision that the Contractor has failed to make such good faith effort, the Contracting Officer shall give the Contractor written notice specifying the failure and permitting the Contractor to demonstrate what good faith efforts have been made and to discuss the matter. Failure to respond to the notice may be taken as an admission that no valid explanation exists. If, after consideration of all the pertinent data, the Contracting Officer finds that the Contractor failed to make a good faith effort to comply with the subcontracting plan, the Contracting Officer shall issue a final decision to that effect and require that the Contractor pay the Government liquidated damages as provided in paragraph (b) of this clause.

(d) With respect to commercial plans, the Contracting Officer who approved the plan will perform the functions of the Contracting Officer under this clause on behalf of all agencies with contracts covered by the commercial plan.

(AM-0001)

(v) floods,

(vi) epidemics,

(vii) quarantine restrictions,

(viii) strikes,

(ix) freight embargoes,

(x) unusually severe weather, or delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined 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 termination had been issued for the convenience of the Government.

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

52.253-1 COMPUTER GENERATED FORMS (JAN 1991)

(a) Any data required to be submitted on a Standard or Optional Form prescribed by the Federal Acquisition Regulation (FAR) may be submitted on a computer generated version of the form, provided there is no change to the name, content, or sequence of the data elements on the form, and provided the form carries the Standard or Optional Form number and edition date.

(b) Unless prohibited by agency regulations, any data required to be submitted on an agency unique form prescribed by an agency supplement to the FAR may be submitted on a computer generated version of the form provided there is no change to the name, content, or sequence of the data elements on the form and provided the form carries the agency form number and edition date.

(c) If the Contractor submits a computer generated version of a form that is different than the required form, then the rights and obligations of the parties will be determined based on the content of the required form.

*52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999)

(a) Definition. HUBZone small business concern, as used in this clause, means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

(b) Evaluation preference. (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except--

(i) Offers from HUBZone small business concerns that have not waived the evaluation preference;

(ii) Otherwise successful offers from small business concerns;

(iii) Otherwise successful offers of eligible products under the Trade Agreements Act when the dollar threshold for application of the Act is exceeded (see 25.402 of the Federal Acquisition Regulation (FAR)); and

(iv) Otherwise successful offers where application of the factor would be inconsistent with a Memorandum of Understanding or other international agreement with a foreign government.

(2) The factor of 10 percent shall be applied on a line item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) A concern that is both a HUBZone small business concern and a small disadvantaged business concern will receive the benefit of both the HUBZone small business price evaluation preference and the small disadvantaged business price evaluation adjustment (see FAR clause 52.219-23). Each applicable price evaluation preference or adjustment shall be calculated independently against an offeror's base offer.

These individual preference amounts shall be added together to arrive at the total evaluated price for that offer.

(c) Waiver of evaluation preference. A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragraph (d) of this clause do not apply if the offeror has waived the evaluation preference.

___ Offeror elects to waive the evaluation preference.

(d) Agreement. A HUBZone small business concern agrees that in the performance of the contract, in the case of a contract for

(1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;

(2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;

(3) General construction, at least 15 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns; or

(4) Construction by special trade contractors, at least 25 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns.

(e) A HUBZone joint venture agrees that in the performance of the contract, the applicable percentage specified in paragraph (d) of this clause will be performed by the HUBZone small business participant or participants.

(f) A HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business manufacturer concerns. This paragraph does not apply in connection with construction or service contracts.

(End of clause)

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APPENDIX A LIST OF DRAWINGS

(AM-0001)

(11) Emergency procedures that would be taken if an accident of spill of asbestos containing material occurs during the transport of asbestos containing waste. (40 CFR 61.20-25).

(12) Methods and equipment used to off load and bury asbestos containing waste control airborne emissions at the burial site. (40 CFR 61.20-25).

(g) The Contractor shall complete and return to the Contracting Officer within 15 working days after the completion of all airborne asbestos monitoring conducted under this contract, a 'Summarization of Airborne Asbestos Sampling Results' form (ENG Form 4921-R, Jan 86) provided by the Government. NOTE: This completed summarization form is to be used by the US Army Corps of Engineers for statistical information purposes and does not relieve the Contractor from his recordkeeping requirements as described in 29 CFR 1910.1001(i) and 1910.20.

[End of Statement]

* ~~S-14 PRICE ADJUSTMENT FOR CONTINGENT SCOPE OF WORK (DELETED)~~

~~As of the time this contract is awarded, the Government is uncertain as to presence of asbestos in the buildings or any other structures to be worked on by the Contractor. Upon discovering presence of asbestos in any part of the structures, the Contractor shall notify the Government thereof as soon as practicable. Upon becoming aware of presence of asbestos in any part of the structures through the contractor's notice or otherwise, the Government shall modify the contract for asbestos abatement and make an equitable adjustment to the contract price as called under the contract clause entitled Changes.~~

[End of Statement]

*

52.231-5000 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE.

EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995) — EFARS

(a) This clause does not apply to terminations. See 52.249-5000, Basis for settlement of proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, Region *[insert Roman numeral for the appropriate region of the schedule]*. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(AM-0001)

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(End of clause)

52.249-5000 BASIS FOR SETTLEMENT OF PROPOSALS.

BASIS FOR SETTLEMENT OF PROPOSALS

"Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total cost basis, the following principles will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable expenses will be used to determine equipment operating expenses.

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate."

(End of Statement)

*S-36.10 WARRANTY IMPLEMENTATION (MARCH 2000)

(a) The Contractor shall designate a representative within the State of Hawaii to implement the Warranty of Construction clause. The Contractor may designate himself provided he has a permanent office in the State of Hawaii. The Contractor may designate different representatives for separate specialties of work.

(b) The name, address, telephone number of each representative, and nomenclature of warranty item shall be submitted to the Contracting Officer's representative at least 30 days prior to the contract completion date or beneficial occupancy of the work or part thereof. For the purposes of paragraph f of the warranty clause, a reasonable time shall be considered to be as follows:

(AM-0001)

(1) 21 calendar days from the receipt of a written notification of any failure, defect, or damage of such nature that the work remains functional or habitable or both, as applicable.

(2) 24 hours for failures, defects or damages which render the work nonfunctional or uninhabitable or both, as applicable. Response in this instance starts from receipt of verbal notification from an authorized Government representative. Written confirmation will follow the initial verbal request.

[End of Statement]

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(AM-0001)

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SECTION 13206

GROUND STORAGE RESERVOIRS

PART 1 GENERAL

1.1 SUMMARY

This section shall apply to the new water reservoir and also cover retrofit and refurbishing work associated with the existing tank. All new nozzles, appurtenances, controls, coating, and testing requirements for the existing tank shall comply with this specification.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

- ASTM A 53 (1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- ASTM D 4285 (1983; R 1993) Indicating Oil or Water in Compressed Air

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- ASME B40.1 (1991) Gauges - Pressure Indicating Dial Type - Elastic Element

AMERICAN WATER WORKS ASSOCIATION (AWWA)

- AWWA C110 (1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
- AWWA C115 (1996) Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
- AWWA C151 (1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
- AWWA C600 (1993) Installation of Ductile-Iron Water Mains and Their Appurtenances
- AWWA C652 (1992) Disinfection of Water-Storage Facilities
- AWWA D100 (1996) Welded Steel Tanks for Water Storage
- AWWA D103 (1997) Factory-Coated Bolted Steel Tanks

for Water Storage

BUREAU OF RECLAMATION (BOR)

BOR Paint Mnl (1976) Paint Manual

FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 150/5345-43 (Rev E) Obstruction Lighting Equipment

MILITARY SPECIFICATIONS (MS)

MS DOD-C-24654 (Basic) Coatings, Epoxy, Potable Water Tanks (Metric)

MS MIL-P-24441/GEN (Rev B; Am 1, Supple 1) Paint, Epoxy-Polyamide (Inch-Pound)

NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE)

NACE RP0287 (1995) Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using a Replica Tape

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 22 (1998) Water Tanks for Private Fire Protection

NSF INTERNATIONAL (NSF)

NSF 61 (1998) Drinking Water System Components - Health Effects (Sections 1-9)

THE SOCIETY FOR PROTECTIVE COATING (SSPC)

SSPC-PS Guide 17.00 (1991) Guide for Selecting Urethane Painting System

SSPC SP 5/NACE 1 (1994) White Metal Blast Cleaning

SSPC SP 7/NACE 4 (1994) Brush-Off Blast Cleaning

SSPC VIS 1 (1989) Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs)

SSPC Guide to VIS 1 (1989) Guide to Visual Standard for Abrasive Blast Cleaned Steel

1.3 GENERAL REQUIREMENTS

1.3.1 Design and Construction Standards

The design, fabrication, and erection of the reservoir shall be in accordance with the applicable requirements of AWWA D100 or AWWA D103 except as modified herein. Design metal temperature shall be 10 degrees C (degrees F). Seismic design shall be in accordance with Sections 13080 PROTECTION FOR MISCELLANEOUS EQUIPMENT and 15070 SEISMIC PROTECTION FOR

MECHANICAL EQUIPMENT. No additional thickness for corrosion allowance will be required. The reservoir shall be designed for a peak wind speed of 169 km per hour. The new tank shall also comply with the requirements of NFPA 22 and Appendix A and B of NFPA 22.

1.3.2 Welding for Tanks

Qualification of Welding Procedures, Welders, and Welding Operators for Welded Tanks, Section 8.2 of AWWA D100.

1.3.3 Design Requirements

The reservoir shall have a minimum storage capacity as indicated on the drawings. The high-water level of reservoir shall be at the elevation indicated on the drawings with the top of foundation approximately at elevation. The range between high and low water levels will be as indicated on the drawings. Existing grade at proposed location is approximately elevation 2.04 m. The reservoir shall have such standard shell height and such diameter as will meet the requirements for the selected standard capacity and for the high-water level specified above. The reservoir may have aluminum self-supporting dome roof, as approved. The reservoir shall be of welded or bolted construction.

1.3.4 Sizing of Standpipe and Reservoir

Section 6 of AWWA D100 or Section 4 of AWWA D103.

1.3.5 Coatings Certification

Coating materials for interior applications and all other materials which will be in normal contact with potable water shall conform to NSF 61. Certification by an independent third-party organization that all interior coatings and materials that come in contact with potable water comply with NSF 61 shall be provided. The exterior color of the tank shall be approved by Hickam Air Force Base prior to fabricating the tank.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

General Requirements; FIO. Foundations; FIO. Tank color; GA.

Design analyses and calculations.

SD-04 Drawings

Steel Standpipes and Ground Storage Reservoirs; FIO.

Detail and erection drawings, before proceeding with any fabrication. The drawings shall be complete with details of all steel, pipe, and concrete work and with details of the assembling of all items required for the complete installation. Standard welding symbols as recommended by the American Welding Society shall be used. Details of all joints referenced

on the drawings shall also be included.

SD-09 Reports

Tank Installation; FIO. Testing of Valves and Piping; FIO.

Copies of the following test results:

- a. Manufacturer's mill test reports for plate material.
- b. Mill and shop inspections by a commercial inspection agency.
- c. After acceptance of the structure, the radiographic film and/or test segments.
- d. At the conclusion of the work, a written report prepared by the Contractor certifying that the work was inspected in accordance with Section 11 of AWWA D100 or Section 9 of AWWA D103. The report shall also cover the hydrostatic and vacuum box leak tests and shall meet the requirements of Section 11.2.1 of AWWA D100 for welded tanks.

SD-13 Certificates

General Requirements; FIO. Foundations; FIO.

Certification by an independent third-party organization that all interior coating and materials that come in contact with the potable water comply with NSF 61.

A certificate signed by a registered professional engineer, providing the following information:

- a. Description of the structural design loading conditions used for the design of entire tank including the foundation.
- b. Description of the structural design method and codes used in establishing the allowable stresses and safety factors applied in the design.
- c. A statement verifying that the structural design has been checked by experienced engineers specializing in hydraulic structures.
- d. A statement verifying that the detail drawings have been checked by experienced engineers specializing in hydraulic structures to determine that they agree with the design calculations in member sizes, dimensions, and fabricating process as prescribed by the applicable AWWA standards.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall conform to the following requirements:

2.1.1 Steel and Other Tank Materials

Section 2 of AWWA D100 or Section 2 of AWWA D103.

2.1.2 Shop Fabrication

Section 9 of AWWA D100 or Section 7 of AWWA D103.

2.1.3 Ductile-Iron Pipe

Pipe shall be ductile-iron pipe except for overflow piping. Pipes, fittings and specials shall conform to the requirements of ductile-iron pipe specified in Section 02510 WATER DISTRIBUTION SYSTEM and the paragraphs below:

2.1.3.1 Pressure Ratings

Flanged pipes, fittings and specials shall conform to the applicable portions of AWWA C110, AWWA C115, and AWWA C151 for working pressure not less than 1034 kPa (150 psi) unless otherwise shown or specified.

2.1.3.2 Joints

Grooved and shouldered joints shall not be used.

2.1.4 Valves

Valves shall conform to the applicable requirements specified in Section 13920 FIRE PUMPS. In addition, the supply to the reservoir shall be controlled as indicated on the drawings by altitude valve(s), automatic in operation and accurately set to prevent overflow of the reservoir. The valve(s) shall have flanged ends and a heavy cast iron body, shall be bronze fitted with renewable cups and seats, and shall be designed without metal-to-metal seats. The valve(s) shall be cushioned when opening and closing to prevent water hammer or shock. Valves shall be provided with a travel indicator.

2.1.5 Pressure Gauge

Pressure gauge of the direct-reading type, equipped with a shutoff cock, shall be provided, in the valve chamber, on the tank side and on the discharge side of the check or altitude valve. Gauges shall have 150 mm (6 inch) dials, shall be stem mounted, and shall conform to ASME B40.1. Accuracy of gauges shall be Grade A or better. Gauges shall be calibrated in kilopascals and pounds per square inch in not more than 10 kilopascals and 2 pound increments from 0 to 350 kilopascals and 0 to 350 pounds in excess of the normal operating pressure at the tank.

2.2 ASSEMBLIES

2.2.1 Tank Accessories (Existing and New)

Section 7 of AWWA D100 or Section 5 of AWWA D103 and as hereinafter specified. Additional requirements for accessories are as follows:

2.2.1.1 Manholes and Pipe Connections (Existing and New)

Section 7 of AWWA D100 and Section 5 of AWWA D103 represent the minimum requirements. Number, type, location, and size of manholes and pipe connections will be as shown on the drawings. Inlet pipe connections to extend minimum 7620 mm above tank bottom and shall be provided with deflectors as shown on the drawings. Outlet pipe connections shall be aligned to match pump suction invert height and shall be provided with

vortex breakers as shown on the drawings.

2.2.1.2 Overflow (New Tank Only)

The overflow for the tank shall consist of an overflow weir and outside drop pipe, adequately supported and capable of discharging at a rate of 63 liter per second (1,000 gpm) with 305 mm (12 inches) of head without the water level exceeding the tangent line of the top of the shell. The top of the weir shall be below the tangent line of the top of the shell at an elevation as indicated on the drawings. The weir shall be located as indicated. The overflow pipe shall be steel, ASTM A 53 or equal, and shall terminate 300 to 600 mm above grade and shall be fitted with a flapper valve to prevent ingress of animals and insects.

2.2.1.3 Vent (New Tank Only)

Vent shall be welded or bolted to the cover plate of the center manhole on the roof. Vent will be tank manufacturer's standard type mushroom vent with aluminum bird screen. The free area of the vent shall be sized 50 percent in excess of the 63 liters per second fill rate and 453 liters per second pump-out rate. Screening for vent shall conform to Section 7.7.2 of AWWA D100 or Section 5.7.2 of AWWA D103 which ensures fail-safe operation in the event that screen frosts over and the bottom of the screen shall be sufficiently elevated for snow considerations in the area.

2.2.1.4 Ladders and Safety Devices

Ladders and safety devices shall be provided in accordance with Sections 7.4 and 7.5 of AWWA D100 or Sections 5.4 and 5.5 of AWWA D103. Location of ladders shall be as shown on the drawings. Sections 7.4 and 7.5 of AWWA D100 and Sections 5.4 and 5.5 of AWWA D103 represent the minimum requirement. In addition, safety cage, rest platforms, roof ladder handrails, and other safety devices shall be provided as required by federal or local laws or regulations.

2.2.1.5 Scaffold Cable Support

Provision shall be made for the attachment of a scaffold cable support at the top of the roof on welded tanks.

2.2.2 Anchors

The following requirements shall be met:

- a. An adequate number of anchors designed to prevent overturning of the reservoir when empty shall be installed. If anchor bolts are used, the nominal diameter shall not be less than 25 mm (1 inch), plus a corrosion allowance of at least 6 mm (1/4 inch) on the diameter. If anchor straps are used, they shall be pre-tensioned before welding to the tank shell.
- b. The anchor bolts shall be a right angle bend, hook, or plate washer, while anchor straps shall have only a plate welded to the bottom. The anchors shall be inserted into the foundation to resist the computed uplift.
- c. Attachment of anchors to the shell shall not add significant localized stresses to the shell. The method of attachment shall consider the effects of deflection and rotation of the tank shell.

Anchors shall not be attached to the tank bottom. Attachment of the anchor bolts to the shell shall be through stiffened chair-type assemblies or anchor rings of adequate size and height.

2.3 LEVEL INDICATOR

Level indicator shall be as indicated on the drawings.

2.4 LIQUID LEVEL RECORDER

The entire recording controller shall be contained in a weatherproof case for mounting as detailed on the drawings. The recorder shall be provided with a 7-day battery-operated chart drive. The case shall be constructed of glass-fiber-reinforced plastic with gasketed door and shatterproof glass window which provides the environmental protection of NEMA Type 3. Contractor shall furnish complete installation and operating instructions and 100 charts and 10 fibertip disposable pens. Graduation of the instrument scale shall be uniform and read in meters with a range of 0 to 10 meters. Accuracy shall be +0.75 percent of span minimum. Measuring element shall be of brass.

2.5 TANK FLOAT SWITCH

Float switches shall be displacement type operating on buoyancy theory. displacers shall be constructed of porcelain, adjustable along any point on a single suspension cable. Switches shall be dry contact type in NEMA 4 housing with flanged mounted plate. Schedule 40 steel pipe stilling well shall be provided with float switch assembly for mounting to water storage tank. Touch-up painting of interior and exterior of tank affected by installation of float switch shall be in accordance with Section 09900 PAINTING, GENERAL.

2.6 FLOAT SWITCH CONTROL PANEL

The panel shall be fabricated as shown. The panel shall be fabricated as a bottom-entry connection point for control-system electric power and control-system wiring. The panel shall have an operating temperature rise of not greater than 6.7 degrees C above an ambient temperature of 38 degrees C. The control panel shall be powered by nominal 120 volts ac terminating at the panel on terminal blocks. Instrument cases shall be grounded. Interior panel, interior door, and exterior panel enclosure shall be grounded. The enclosure for each panel shall be a NEMA 4 single-door wall-mounted box conforming to NEMA 250, with continuous hinged and gasketed exterior door with key lock. Inside finish shall be white enamel, and outside finish shall be gray primer over phosphatized surfaces. Controllers, pilot lights, and switches shall be mounted on the interior door. All other components housed in the panel shall be mounted on the interior back panel surface of the enclosure, behind the door on rails. Controllers and gauges shall be identified by a plastic or metal nameplate that is mechanically attached to the panel. The nameplate shall have the inscription as shown. Lettering shall be cut or stamped into the nameplate to a depth of not less than 0.4 mm, and shall show a contrasting color, produced by filling with enamel or lacquer or by the use of a laminated material. Painting of lettering directly on the surface of the interior door or panel is not permitted. Pilot lights and switches shall be rectangular devices arranged in a horizontal matrix as shown. Momentary switches shall be non-illuminated. Interlocking switches shall have separately illuminated sections. Device illumination shall be by light-emitting diode or neon lamp.

2.6.1 Transformer and Wiring

Transformer shall be provided for electric or electronic controls when required. Spare circuits in electric panels shall not be used for controls. Control wiring shall not be connected to lighting circuits. Electric and electronic control systems shall use coaxial or shielded twisted pair cables with solderless connectors for input and output control signals. Control system wiring shall be completely separate from control signals. Control wiring to control panels shall terminate at suitable terminal strips, all properly identified.

2.6.2 Control Relays

General purpose bypass, with plug in socket screen terminal connections, with 2 normally open and 2 normally closed sets of contacts, unless otherwise indicated, and coil voltage as indicated.

2.7 ALTITUDE VALVE

Altitude valve shall be sized as indicated on the drawings and automatic in operation and accurately set to prevent tank overflow. Valve shall have flanged ends and a heavy cast-iron body, bronze-fitted with renewable cups and seats, and designed without metal-to-metal seats. Cushion valve when opening and closing to prevent water hammer or shock. The altitude valve shall be pilot operated. The valve shall control the high water level in the tank. The valve shall only provide one-way flow. It shall be non-throttling type valve, and remain fully open until "shutoff" point in the tank is reached. The valve shall be hydraulically operated, diaphragm activated, globe or angle pattern valve. The valve shall contain a resilient, synthetic rubber disk and the diaphragm shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm shall consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls. The pilot control shall be of a diaphragm activated, 3-way type that operates on the differential force between the height of the water in the tank and an adjustable spring load. The entire valve and control system shall be designed so that no surface water can be drawn into the pilot system or main valve at any time. Pilot piping shall be copper tubing with corporation cock and strainer.

PART 3 EXECUTION

3.1 FOUNDATIONS

The design of the tank foundation shall be in accordance with the recommendations of the tank manufacturer and shall be reviewed and stamped by a registered Structural Engineer. Foundations for the reservoir and for the valve chamber shall be constructed on concrete, reinforced where necessary, and designed in accordance with Section 12 of AWWA D100 or Sections 11 and 8.5 of AWWA D103 for earth with a bearing value of 100 kPa, at elevation 2.04 m, and shall be constructed in conformance with the applicable requirements of Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE, except as shown or specified herein. An AWWA D100 Type 1 or an AWWA D103 Type 1 or Type 2 foundation shall be provided for the reservoir. Factor of safety on overturning of reservoir under design wind load shall be 1.33 minimum. When a footing is required, an inverted truncated pyramid of

earth with 2 on 1 side slopes above top of footing may be used in determining overturning stability.

3.2 EXCAVATING, FILLING, AND GRADING

Excavating, filling, and grading shall conform to the applicable requirements of Section 02315 EXCAVATION, FILLING AND BACKFILLING FOR BUILDINGS.

3.3 CATHODIC PROTECTION

Cathodic protection shall conform to Section 13111 CATHODIC PROTECTION SYSTEM (STEEL WATER TANKS).

3.4 OBSTRUCTION LIGHTING

Obstruction lighting shall be provided and installed as shown, and shall conform to FAA AC 150/5345-43.

3.5 TANK INSTALLATION

Tank installation shall be in accordance with the following requirements:

3.5.1 Welding

Section 8 of AWWA D100 or Section 6 of AWWA D103.

3.5.2 Erection

Section 10 of AWWA D100 or Section 8 of AWWA D103.

3.5.3 Inspections and Testing

Tank inspections and testing shall be in accordance with Section 11 of AWWA D100 or Section 9 of AWWA D103. Mill and shop inspections shall be performed by an approved commercial inspection agency. Radiographic inspections of the welded tank shell shall be performed by the Contractor. The Contractor shall perform the hydrostatic test and the vacuum box leak test of the tank bottom. Final leak test and hydrostatic test shall be performed before painting of welded tanks.

3.6 PIPING INSTALLATION

Piping installation (except for overflow piping):

3.6.1 General Guidelines

Where details of fabrication or installation are not shown on the drawings, installation shall conform to AWWA C600.

3.6.2 Testing of Valves and Piping

After the reservoir has been erected and the valves and piping installed, and before field painting is begun, the valves and piping shall be hydrostatically tested in accordance with Section 4 of AWWA C600. The Contractor shall replace with sound material any defective material disclosed by the pressure test, and the test shall be repeated until the test results are satisfactory.

3.6.3 Plugging Ends

Pipe ends left for future connections shall be capped or plugged as directed.

3.7 SURFACE PREPARATION (EXISTING TANK ONLY)

3.7.1 Abrasive Blasting Equipment

Abrasive blasting equipment of the conventional air, force-feed, or pressure type shall be used. Minimum pressure of 650 kPa shall be maintained at nozzle. Air supply shall be filtered so that the air is free of oil and moisture when tested in accordance with ASTM D 4285. Compressed air quality shall be tested at each startup, but in no case less often than every five operating hours

3.7.2 Clean and Repair

All blast surfaces shall be brushed off in accordance with SSPC SP 7/NACE 4. After abrasive blasting, abrasive and dust shall be removed from surfaces by brushing, blowing with dry compressed air, and vacuuming. Tank interior shall be examined for defects. Defects found, such as cracks or splits, shall be repaired by welding. Rough surfaces on weld seams, sharp edges, and corners shall be ground off to a radius of not less than 3 mm. Sharp depressions or deep pits shall be welded and ground off smooth.

3.7.3 Surface Standard

Tank walls shall be inspected and panels with similar characteristics and surface characteristics shall be selected for use as site-specific surface standard. One or more 300 mm square steel panels shall be blast cleaned. Surface preparation and profile shall be as specified in paragraph SURFACE PREPARATION. Blast nozzle type and size, air pressure at nozzle and compressor, distance of nozzle from panel, and angle of blast to establish procedures for blast cleaning shall be recorded. Surface profile shall be measured in accordance with NACE RP0287. Plastic test tapes shall be attached to Contracting Officer's copy of appropriate daily test reports. Surface standard shall be sealed with a clearcoat protectant, or kept wrapped and sealed in vapor-tight material, for use as a standard of comparison for the steel surfaces throughout the course of work.

3.7.4 Abrasive Blasting

Steel surfaces shall be abrasive blasted to white metal in accordance with SSPC SP 5/NACE 1. Prepared surfaces shall conform to SSPC VIS 1 and SSPC Guide to VIS 1, and shall match the prepared test panels. A 50 to 75 micron surface profile shall be provided. Surface profile greater than 75 microns will not be accepted. Surface profile shall be measured in accordance with NACE RP0287. Plastic test tapes shall be attached to Contracting Officer's copy of appropriate daily test reports. Wood blocks shall be used to wedge roof plates above roof trusses to blast surfaces between roof trusses and roof plates.

3.7.5 Cleanup After Abrasive Blasting

After abrasive blasting, loose material shall be removed from tank interior, and from the surfaces by vacuuming. When all surfaces of tank will be prepared prior to beginning the coating process, a bed of grit may remain on the floor to protect the prepared surface. If this option is

chosen, no coatings shall be applied within two meters of floor until grit and loose material have been removed. If grit bed is used, grit shall be removed when preparing to coat floor surface; reblast as necessary to ensure specified surface preparation; and grit shall be vacuumed from floor and all roof and shell surfaces. The use of a grit bed to protect prepared floor surfaces will not be cause for Government acceptance of dust contaminated surfaces.

3.7.6 Disposal of Used Abrasive

Used abrasive shall be disposed of at a landfill off Government property in accordance with applicable regulations.

3.7.7 Pre-Application Testing for Surface Cleanliness

Coatings shall be applied to dust free surfaces. To test surfaces, a strip of clear adhesive tape shall be applied to surface and rubbed onto surface with finger. When removed, the tape should show little or no dust, blast abrasive, or other contaminant. Contaminated surfaces shall be vacuumed and retested. Tank bottom shall be tested at the rate of five tests for the first 100 square meters plus two tests for each additional 100 square meters or part thereof. Tank shell and roof shall be tested at the rate of two tests per 100 square meters or part thereof.

3.8 PAINTING AND COATING OF TANK (EXISTING AND NEW)

Coating materials shall be delivered to the job site in their original containers bearing the manufacturer's name, product number, and volatile organic compound (VOC) content (grams per liter). Material Safety Data Sheets (MSDS) shall be provided for coatings.

3.8.1 Welded Tanks (Existing and New)

3.8.1.1 Exterior Surfaces

A gray vinyl prime coat a minimum of 0.04 mm thick followed by two coats of light gray vinyl paint, each a minimum of 0.04 mm thick. The primer and paint shall be VR-3 in accordance with BOR Paint Mnl. A two-component catalyzed epoxy prime and intermediate coat, each a minimum of 0.08 mm thick, followed by a two-component catalyzed aliphatic polyurethane finish coat, a minimum of 0.04 mm thick, conforming to Type V of SSPC-PS Guide 17.00. The prime coat shall be a green primer, Formula 150 in accordance with MS MIL-P-24441/GEN. The immediate coat shall be white Formula 152 in accordance with MS MIL-P-24441/GEN and may be tinted with pigment color. The finish coat shall match the existing tank color.

3.8.1.2 Interior Surfaces

A prime coat at least 0.08 mm thick and a white final coat at least 0.13 mm thick. Each coat shall be a two-component catalyzed epoxy in accordance with MS DOD-C-24654. The primer shall contrast with the color of the finish coat, four coats, each at least 0.04 mm thick, of VR-3 vinyl resin paint in accordance with BOR Paint Mnl. The second, third, and fourth coats shall be of contrasting colors.

3.8.2 Bolted Tanks

The tanks shall have a coating applied to both the interior and exterior surfaces in accordance with Section 10 of AWWA D103. Color shall match the

existing tank and hangar color and shall be approved by Hickam Air Force Base. Color samples shall be provided and approved prior to start of work. Bolted tanks shall be provided with a 10 year warranty for corrosion and any defects in the lining of the tank.

3.9 DISINFECTION

The reservoir and connecting lines thereto shall be disinfected with chlorine before being placed in operation.

3.9.1 Tank

The reservoir shall be disinfected by the Contractor in accordance with AWWA C652. After the chlorination procedure is completed and before the storage facility is placed in service, the Contracting Officer will collect samples of water in properly sterilized containers for bacteriological testing from the full facility in accordance with paragraph 4.4.3 of AWWA C652. The tank will not be accepted until satisfactory bacteriological results have been obtained.

3.9.2 Piping

The valves and piping shall be disinfected by the Contractor in accordance with Section 02510 WATER DISTRIBUTION SYSTEM.

-- End of Section --

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SECTION 13851

FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI S3.41 (1990; R 1996) Audible Emergency
Evacuation Signals

CODE OF FEDERAL REGULATIONS (CFR)

47 CFR 15 Radio Frequency Devices

FACTORY MUTUAL ENGINEERING AND RESEARCH (FM)

FM P7825a (2001) Approval Guide Fire Protection

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41 (1991; R 1995) Surge Voltages in
Low-Voltage AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

NFPA 72 (1999) National Fire Alarm Code

NFPA 90A (1999) Installation of Air Conditioning
and Ventilating Systems

NFPA 1221 (1999) Communications, Emergency Services

UNDERWRITERS LABORATORIES (UL)

UL 6 (1997) Rigid Metal Conduit

UL 38 (1994; Rev Nov 1994) Manually Actuated
Signaling Boxes for Use with
Fire-Protective Signaling Systems

UL 268 (1996; Rev thru Jun 1998) Smoke Detectors
for Fire Protective Signaling Systems

UL 268A (1998) Smoke Detectors for Duct
Applications

UL 464	(1996; Rev May 1997) Audible Signal Appliances
UL 521	(1993; Rev Oct 1994) Heat Detectors for Fire Protective Signaling Systems
UL 797	(1993; Rev thru Mar 1997) Electrical Metallic Tubing
UL 864	(1996) Control Units for Fire-Protective Signaling Systems
UL 1242	(1996; Rev Mar 1998) Intermediate Metal Conduit
UL 1971	(1995; Rev thru May 1997) Signaling Devices for the Hearing Impaired
UL Fire Prot Dir	(2001) Fire Protection Equipment Directory

1.2 GENERAL REQUIREMENTS

1.2.1 Standard Products

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that can provide service within 24 hours of notification.

1.2.2 Nameplates

Major components of equipment shall have the manufacturer's name, address, type or style, voltage and current rating, and catalog number on a noncorrosive and nonheat-sensitive plate which is securely attached to the equipment.

1.2.3 Keys and Locks

Locks shall be keyed alike. Four keys for the system shall be provided.

1.2.4 Tags

Tags with stamped identification number shall be furnished for keys and locks.

1.2.5 Verification of Dimensions

After becoming familiar with details of the work, the Contractor shall verify dimensions in the field and shall advise the Contracting Officer of any discrepancy before performing the work.

1.2.6 Compliance

The fire detection and alarm system and the central reporting system shall be configured in accordance with NFPA 72; exceptions are acceptable as directed by the Contracting Officer. The equipment furnished shall be compatible and be UL listed (UL Fire Prot Dir), FM approved (FM P7825a), or approved or listed by a nationally recognized testing laboratory in accordance with the applicable NFPA standards.

1.2.7 Qualifications

1.2.7.1 Engineer and Technician

a. Registered Professional Engineer with verification of experience and at least 4 years of current experience in the design of the fire protection and detection systems.

b. National Institute for Certification in Engineering Technologies (NICET) qualifications as an engineering technician in fire alarm systems program with verification of experience and current NICET certificate.

c. The Registered Professional Engineer may perform all required items under this specification. The NICET Fire Alarm Technician shall perform only the items allowed by the specific category of certification held.

1.2.7.2 Installer

The installing Contractor shall provide the following: NICET Fire Alarm Technicians to perform the installation of the system. A NICET Level 4 Fire Alarm Technician shall supervise the installation of the fire alarm system. NICET Level 2 or higher Fire Alarm Technician shall install and terminate fire alarm devices, cabinets and panels. An electrician or NICET Level 1 Fire Alarm Technician shall install conduit for the fire alarm system. The Fire Alarm technicians installing the equipment shall be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.2.7.3 Design Services

The Contractor shall design an addressable/programmable fire alarm system complete and ready for use. The entire fire alarm system shall be designed by a Fire Protection Engineer meeting the requirements of this section. Installations requiring designs or modifications of fire detection, fire alarm, or fire suppression systems shall require the services and review of a qualified fire protection engineer. For the purposes of meeting this requirement, a qualified fire protection engineer is defined as an individual meeting one of the following conditions:

- a. An engineer having a Bachelor of Science or Masters of Science Degree in Fire Protection Engineering from an accredited university engineering program, plus a minimum of 2 years' work experience in fire protection engineering.
- b. A registered professional engineer (P.E.) in fire protection engineering.
- c. A registered PE in a related engineering discipline and member grade status in the National Society of Fire Protection Engineers.
- d. An engineer with a minimum of 10 years' experience in fire protection engineering and member grade status in the National Society of Fire Protection Engineers.

1.3 SYSTEM DESIGN

1.3.1 Operation

The fire alarm and detection system shall be a complete, supervised fire alarm system. The system shall be activated into the alarm mode by actuation of any alarm initiating device. The system shall remain in the alarm mode until the initiating device is reset and the fire alarm control panel is reset and restored to normal. Alarm initiating devices shall be connected to initiating device circuits (IDC), Style D, to signal line circuits (SLC), Style 6 ALPHA, in accordance with NFPA 72. Alarm notification appliances shall be connected to notification appliance circuits (NAC), Style Z in accordance with NFPA 72. A looped conduit system shall be provided so that if the conduit and all conductors within are severed at any point, all IDC, NAC and SLC will remain functional. The conduit loop requirement is not applicable to the signal transmission link from the local panels (at the protected premises) to the Supervising Station (fire station, fire alarm central communication center). Textual, audible, and visual appliances and systems shall comply with NFPA 72. Fire alarm system components requiring power, except for the control panel power supply, shall operate on 24 Volts dc. Addressable system shall be microcomputer (microprocessor or microcontroller) based with a minimum word size of eight bits and shall provide the following features:

- a. Sufficient memory to perform as specified and as shown for addressable system.
- b. Individual identity of each addressable device for the following conditions: alarm; trouble; open; short; and appliances missing/failed remote detector - sensitivity adjustment from the panel for smoke detectors
- c. Capability of each addressable device being individually disabled or enabled from the panel.
- d. Each SLC shall be sized to provide 40 percent addressable expansion without hardware modifications to the panel.

1.3.2 Operational Features

The system shall have the following operating features:

- a. Monitor electrical supervision of IDC, SLC, and NAC. Smoke detectors shall have combined alarm initiating and power circuits.
- b. Monitor electrical supervision of the primary power (ac) supply, battery voltage, placement of alarm zone module (card, PC board) within the control panel, and transmitter tripping circuit integrity.
- c. A trouble buzzer and trouble LED/LCD (light emitting diode/liquid crystal diode) to activate upon a single break, open, or ground fault condition which prevents the required normal operation of the system. The trouble signal shall also operate upon loss of primary power (ac) supply, low battery voltage, removal of alarm zone module (card, PC board), and disconnection of the circuit used for transmitting alarm signals off-premises. A trouble alarm silence switch shall be provided which will silence the trouble buzzer, but will not extinguish the trouble indicator LED/LCD. Subsequent trouble and supervisory alarms shall sound the trouble signal until silenced. After the system returns to normal operating conditions, the trouble buzzer shall again sound until

the silencing switch returns to normal position, unless automatic trouble reset is provided.

- d. A one person test mode. Activating an initiating device in this mode will activate an alarm for a short period of time, then automatically reset the alarm, without activating the transmitter during the entire process.
- e. A transmitter disconnect switch to allow testing and maintenance of the system without activating the transmitter but providing a trouble signal when disconnected and a restoration signal when reconnected.
- f. Evacuation alarm silencing switch which, when activated, will silence alarm devices, but will not affect the zone indicating LED/LCD nor the operation of the transmitter. This switch shall be over-ridden upon activation of a subsequent alarm from an unalarmed device and the NAC devices will be activated.
- g. Electrical supervision for circuits used for supervisory signal services (i.e., sprinkler systems, valves, etc.). Supervision shall detect any open, short, or ground.
- h. Confirmation or verification of all smoke detectors. The control panel shall interrupt the transmission of an alarm signal to the system control panel for a factory preset period. This interruption period shall be adjustable from 1 to 60 seconds and be factory set at 20 seconds. Immediately following the interruption period, a confirmation period shall be in effect during which time an alarm signal, if present, will be sent immediately to the control panel. Fire alarm devices other than smoke detectors shall be programmed without confirmation or verification.
- i. The fire alarm control panel shall provide supervised addressable relays for HVAC shutdown. An override at the HVAC panel shall not be provided.
- j. The fire alarm control panel shall provide the required monitoring and supervised control outputs needed to accomplish elevator recall.
- k. The fire alarm control panel shall monitor and control the fire sprinkler system, or other fire protection extinguishing system.
- l. The control panel and field panels shall be software reprogrammable to enable expansion or modification of the system without replacement of hardware or firmware. Examples of required changes are: adding or deleting devices or zones; changing system responses to particular input signals; programming certain input signals to activate auxiliary devices.
- m. Zones for IDC and NAC shall be arranged as indicated on the contract drawings.

1.3.3 Alarm Functions

An alarm condition on a circuit shall automatically initiate the following functions:

- a. Transmission of signals over the station radio fire reporting system. The system shall transmit full data signals and be compatible with the Base Fire Reporting System.
- b. Visual indications of the alarmed devices on the fire alarm control panel display and on the remote audible/visual display.
- c. Continuous sounding or operation of alarm notification appliances throughout the building as required by ANSI S3.41.
- d. Closure of doors held open by electromagnetic devices.
- e. Automatic discharge of the designated fire suppression systems. A 15 second maximum delay shall be provided for the deluge system, a 30 second delay for the wet pipe system.
- f. See fire alarm matrix for details.

1.3.4 Primary Power

Operating power shall be provided as required by paragraph Power Supply for the System. Transfer from normal to emergency power or restoration from emergency to normal power shall be fully automatic and not cause transmission of a false alarm. Loss of ac power shall not prevent transmission of a signal via the fire reporting system upon operation of any initiating circuit.

1.3.5 Battery Backup Power

Battery backup power shall be through use of rechargeable, sealed-type storage batteries and battery charger.

1.3.6 Interface With Other Equipment

Interfacing components shall be furnished as required to connect to subsystems or devices which interact with the fire alarm system, such as supervisory or alarm contacts in suppression systems, operating interfaces for smoke control systems, door releases, etc.

1.4 TECHNICAL DATA AND COMPUTER SOFTWARE

Technical data and computer software (meaning technical data which relates to computer software) which is specifically identified in this project, and which may be defined/required in other specifications, shall be delivered, strictly in accordance with the CONTRACT CLAUSES, and in accordance with the Contract Data Requirements List, DD Form 1423. Data delivered shall be identified by reference to the particular specification paragraph against which it is furnished. Data to be submitted shall include complete system, equipment, and software descriptions. Descriptions shall show how the equipment will operate as a system to meet the performance requirements of this contract. The data package shall also include the following:

- (1) Identification of programmable portions of system equipment and capabilities.
- (2) Description of system revision and expansion capabilities and methods of implementation detailing both equipment and software requirements.

- (3) Provision of operational software data on all modes of programmable portions of the fire alarm and detection system.
- (4) Description of Fire Alarm Control Panel equipment operation.
- (5) Description of auxiliary and remote equipment operations.
- (6) Library of application software.
- (7) Operation and maintenance manuals as specified in SD-19 of the Submittals paragraph.

1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. Shop drawings shall be reviewed by the Transatlantic Programs Center, P.O. Box 2250, Winchester, Virginia 22604; Mr. KC Kochhar (540) 665-3907. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Storage Batteries; GA.

Substantiating battery calculations for supervisory and alarm power requirements. Ampere-hour requirements for each system component and each panel component, and the battery recharging period shall be included.

Voltage Drop; GA.

Voltage drop calculations for notification appliance circuits to indicate that sufficient voltage is available for proper appliance operation.

Spare Parts; FIO.

Spare parts data for each different item of material and equipment specified, not later than 3 months prior to the date of beneficial occupancy. Data shall include a complete list of parts and supplies with the current unit prices and source of supply and a list of the parts recommended by the manufacturer to be replaced after 1 year of service.

Technical Data and Computer Software; GA.

Technical data which relates to computer software.

SD-04 Drawings

Fire Alarm Reporting System; GA.

Detail drawings, prepared and signed by a Registered Professional Engineer or a NICET Level 4 Fire Alarm Technician, consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, catalog cuts, and installation instructions. Note that the contract drawings show layouts based on typical detectors. The Contractor shall check the layout based on the actual detectors to be installed and make any necessary revisions in the detail drawings. The detail drawings shall also contain complete wiring and schematic diagrams for the equipment

furnished, equipment layout, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Detailed point-to-point wiring diagram shall be prepared and signed by a Registered Professional Engineer or a NICET Level 4 Fire Alarm Technician showing points of connection. Diagram shall include connections between system devices, appliances, control panels, supervised devices, and equipment that is activated or controlled by the panel.

SD-06 Instructions

Training; FIO.

Lesson plans, operating instructions, maintenance procedures, and training data, furnished in manual format, for the training courses. The operations training shall familiarize designated government personnel with proper operation of the fire alarm system. The maintenance training course shall provide the designated government personnel adequate knowledge required to diagnose, repair, maintain, and expand functions inherent to the system.

SD-08 Statements

Testing; GA.

Detailed test procedures, prepared and signed by a Registered Professional Engineer or a NICET Level 4 Fire Alarm Technician, for the fire detection and alarm system 60 days prior to performing system tests.

SD-09 Reports

Testing; GA.

Test reports, in booklet form, showing field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall document readings, test results and indicate the final position of controls. The Contractor shall include the NFPA 72 Certificate of Completion and NFPA 72 Inspection and Testing Form, with the appropriate test reports.

SD-13 Certificates

Equipment; GA.

Certified copies of current approvals or listings issued by an independent test lab if not listed by UL, FM or other nationally recognized testing laboratory, showing compliance with specified NFPA standards.

Qualifications; GA.

Proof of qualifications for required personnel. The installer shall submit proof of experience for the Professional Engineer, fire alarm technician, and the installing company.

SD-19 Operation and Maintenance Manuals

Technical Data and Computer Software; GA.

Six copies of operating manual outlining step-by-step procedures required for system startup, operation, and shutdown. The manual shall include the manufacturer's name, model number, service manual, parts list, and complete

description of equipment and their basic operating features. Six copies of maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide. The manuals shall include conduit layout, equipment layout and simplified wiring, and control diagrams of the system as installed. The manuals shall include complete procedures for system revision and expansion, detailing both equipment and software requirements. Original and backup copies of all software delivered for this project shall be provided, on each type of media utilized. Manuals shall be approved prior to training.

1.6 DELIVERY AND STORAGE

Equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variation, dirt, dust, and any other contaminants.

PART 2 PRODUCTS

2.1 CONTROL PANEL

Control Panel shall comply with the applicable requirements of UL 864. Panel shall be modular, installed in a surface mounted Type 316 stainless steel cabinet with hinged door and cylinder lock. Control panel shall be a clean, uncluttered, and orderly assembled panel containing components and equipment required to provide the specified operating and supervisory functions of the system. The panel shall have prominent rigid plastic, phenolic or metal identification plates for LED/LCDs, zones, SLC, controls, meters, fuses, and switches. Nameplates for fuses shall also include ampere rating. The LED/LCD displays shall be located on the exterior of the cabinet door or be visible through the cabinet door. Control panel switches shall be within the locked cabinet. A suitable means (single operation) shall be provided for testing the control panel visual indicating devices (meters or LEDs/LCDs). Meters and LEDs shall be plainly visible when the cabinet door is closed. Signals and LEDs/LCDs shall be provided to indicate by zone any alarm, supervisory or trouble condition on the system. Each IDC shall be powered and supervised so that a signal on one zone does not prevent the receipt of signals from other devices. Loss of power, including batteries, shall not require the manual reloading of a program. Upon restoration of power, startup shall be automatic, and shall not require any manual operation. The loss of primary power or the sequence of applying primary or emergency power shall not affect the transmission of alarm, supervisory or trouble signals. Visual annunciation shall be provided for LED/LCD visual display as an integral part of the control panel and shall identify with a word description and id number each device. Cabinets shall be provided with ample gutter space to allow proper clearance between the cabinet and live parts of the panel equipment. If more than one modular unit is required to form a control panel, the units shall be installed in a single cabinet large enough to accommodate units. Cabinets shall be painted red.

2.1.1 Circuit Connections

Circuit conductors entering or leaving the panel shall be connected to screw-type terminals with each conductor and terminal marked for identification.

2.1.2 System Expansion and Modification Capabilities

Any equipment and software needed by qualified technicians to implement

future changes to the fire alarm system shall be provided as part of this contract.

2.1.3 Addressable Control Module

The control module shall be capable of operating as a relay (dry contact form C) for interfacing the control panel with other systems, and to control door holders or initiate elevator fire service. The module shall be UL listed as compatible with the control panel. The indicating device or the external load being controlled shall be configured as a Style Y notification appliance circuits. The system shall be capable of supervising, audible, visual and dry contact circuits. The control module shall have both an input and output address. The supervision shall detect a short on the supervised circuit and shall prevent power from being applied to the circuit. The control model shall provide address setting means compatible with the control panel's SLC supervision and store an internal identifying code. The control module shall contain an integral LED that flashes each time the control module is polled.

2.1.4 Addressable Initiating Device Circuits Module

The initiating device being monitored shall be configured as a Style D initiating device circuits. The system shall be capable of defining any module as an alarm module and report alarm trouble, loss of polling, or as a supervisory module, and reporting supervisory short, supervisory open or loss of polling. The module shall be UL listed as compatible with the control panel. The monitor module shall provide address setting means compatible with the control panel's SLC supervision and store an internal identifying code. Monitor module shall contain an integral LED that flashes each time the monitor module is polled. Pull stations with a monitor module in a common backbox are not required to have an LED.

2.1.5 System Printer

- a. Provide a system strip printer to record all alarm, supervisory, and trouble conditions without loss of any signal or signals. Printout shall be by circuit, device, and function as provided in the FCP. Printer shall operate on a supervised 24 VDC power supply from the control panel. The printer shall be arranged as a module within the control panel or provide in a separate lockable cabinet.

The printer shall have at least 40 characters per line and have a 96 ASCII character set. The printer shall have a microprocessor-controlled, bi-directional, logic seeking head capable of printing 120 characters per second utilizing a 9 by 7 dot matrix print head. Printer shall not contain internal software which is essential for proper operation.

- b. The printer shall preferably be mounted inside the FCP enclosure. If this is not possible, mount the printer in a suitable cabinet next to the FCP with the color matching the color of the FCP enclosure.
- c. When the FCP receives a signal, the alarm, supervisory, and trouble condition shall be printed. The printout shall include the type of signal, the circuit or device reporting, the date, and the time of the occurrence. The printer shall differentiate alarm signals from all other printed indications. When the system is

reset this condition shall also be printed including the same information concerning device, location, date and time. Provide a means to automatically print a list of all existing alarm, supervisory, and trouble conditions in the system. In the event that a printer is off-line when an alarm is received, the system shall have a buffer to retain the data and it shall be printed when the printer is restored to service. The printer shall have an indicator to alert the operator that the paper has run out.

2.2 STORAGE BATTERIES

Storage batteries shall be provided and shall be 24 Vdc sealed, lead-calcium type requiring no additional water. The batteries shall have ample capacity, with primary power disconnected, to operate the fire alarm system for a period of 72 hours. Following this period of battery operation, the batteries shall have ample capacity to operate all components of the system, including all alarm signaling devices in the total alarm mode for a minimum period of 15 minutes. Batteries shall be located at the bottom of the panel or in a separate battery cabinet. Batteries shall be provided with overcurrent protection in accordance with NFPA 72. Separate battery cabinets shall have a lockable, hinged cover similar to the fire alarm panel. The lock shall be keyed the same as the fire alarm control panel. Cabinets shall be painted to match the fire alarm control panel.

2.3 BATTERY CHARGER

Battery charger shall be completely automatic, 24 Vdc with high/low charging rate, capable of restoring the batteries from full discharge (18 Volts dc) to full charge within 48 hours. A pilot light indicating when batteries are manually placed on a high rate of charge shall be provided as part of the unit assembly, if a high rate switch is provided. Charger shall be located in control panel cabinet or in a separate battery cabinet.

2.4 ADDRESSABLE MANUAL FIRE ALARM STATIONS

Addressable manual fire alarm stations shall conform to the applicable requirements of UL 38. Manual stations shall be connected into signal line circuits. Stations shall be installed on surface or flush mounted outlet boxes as indicated. Manual stations shall be mounted at 1220 mm. Stations shall be single action type. Stations shall be finished in red, with raised letter operating instructions of contrasting color. Stations requiring the breaking of glass or plastic panels for operation are not acceptable. Stations employing glass rods are not acceptable. The use of a key or wrench shall be required to reset the station. Gravity or mercury switches are not acceptable. Switches and contacts shall be rated for the voltage and current upon which they operate. Addressable pull stations shall be capable of being field programmed, shall latch upon operation and remain latched until manually reset. Stations shall have a separate screw terminal for each conductor. Surface mounted boxes shall be matched and painted the same color as the mounting surface.

2.5 FIRE DETECTING DEVICES

Fire detecting devices shall comply with the applicable requirements of NFPA 72, NFPA 90A, UL 268, UL 268A, and UL 521. The detectors shall be provided as indicated. Detector base shall have screw terminals for making connections. No solder connections will be allowed. Detectors located in concealed locations (above ceiling, raised floors, etc.) shall have a

remote visible indicator LED/LCD. Addressable fire detecting devices, except flame detectors, shall be dynamically supervised and uniquely identified in the control panel. All fire alarm initiating devices shall be individually addressable, except where indicated. Installed devices shall conform to NFPA 70 hazard classification of the area where devices are to be installed.

2.5.1 Heat Detectors

Heat detectors shall be designed for detection of fire by fixed temperature or rate-compensating principle where indicated in the drawings. Rate compensated detectors shall comply with ETL 98-8 A1.2.3. Heat detector spacing shall be rated in accordance with UL 521. Detectors located in areas subject to moisture, exterior atmospheric conditions, or hazardous locations as defined by NFPA 70, shall be types approved for such locations. Heat detectors located in attic spaces or similar concealed spaces below the roof shall be intermediate temperature rated.

2.5.1.1 Fixed-Temperature Detectors

Detectors shall be designed for surface outlet box mounting and supported independently of wiring connections. Under fixed temperature actuation, the detector shall have a permanent external indication which is readily visible. Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes shall operate on fixed temperature principle only. The UL 521 test rating for the fixed temperature portion shall be 57.2 degrees C.

2.5.1.2 Rate Compensating Detectors

Detectors shall be surface mounted vertical type, with outlet box supported independently of wiring connections. Detectors shall be hermetically sealed and automatically resetting. Rate Compensated detectors shall be rated for 15 by 15 m. Temperature rating shall be 90 degrees C.

2.5.2 Smoke Detectors

Smoke detectors shall be designed for detection of abnormal smoke densities. Smoke detectors shall be photoelectric type. Detectors shall contain a visible indicator LED/LCD that shows when the unit is in alarm condition. Detectors shall not be adversely affected by vibration or pressure. Detectors shall be the plug-in type in which the detector base contains terminals for making wiring connections. Detectors that are to be installed in concealed (above false ceilings, etc.) locations shall be provided with a remote indicator LED/LCD suitable for mounting in a finished, visible location.

2.5.2.1 Photoelectric Detectors

Detectors shall operate on a light scattering concept using an LED light source. Failure of the LED shall not cause an alarm condition. Detectors shall be factory set for sensitivity and shall require no field adjustments of any kind. Detectors shall have an obscuration rating in accordance with UL 268. Addressable smoke detectors shall be capable of having the sensitivity being remotely adjusted by the control panel.

2.5.3 Flame Detectors

The detectors shall comply with FM P7825a. The detectors shall be

sensitive to the micron range best suited for their intended use. The detectors shall operate over electrically supervised wiring circuits and the loss of power to the detector shall result in a trouble signal. A self-test feature shall be provided for each detector to be individually tested.

2.5.3.1 Combination UV/IR Flame Detector

UV/IR detectors shall comply with ETL 98-8. The UV/IR detector shall provide discrimination against false alarms by requiring both UV and IR flame detection before an alarm is sent. The UV sensor shall be sensitive in the range of 0.185 to 0.265 micrometers only. The IR sensor shall be sensitive in the range of 2.9 to 4.4 micrometers only. Detectors shall be completely insensitive to light sources in the visible frequency range.

2.6 NOTIFICATION APPLIANCES

Audible appliances shall conform to the applicable requirements of UL 464. Devices shall be connected into notification appliance circuits. Devices shall have a separate screw terminal for each conductor. Audible appliances shall generate a unique audible sound from other devices provided in the building and surrounding area. Surface mounted audible appliances shall be painted red. Recessed audible appliances shall be installed with a grill that is painted red.

2.6.1 Alarm Bells

Bells shall be surface mounted with the matching mounting back box surface mounted. Bells shall be suitable for use in an electrically supervised circuit. Bells shall be the underdome type producing a minimum output rating of 85 dBA at 3.1 m. unless noted otherwise. Bells used in exterior locations shall be specifically listed or approved for outdoor use and be provided with metal housing and protective grilles. Single stroke, electrically operated, supervised, solenoid bells shall be used for coded applications.

2.6.2 Alarm Horns

Horns shall be surface mounted, with the matching mounting back box surface or recessed mounted, vibrating type suitable for use in an electrically supervised circuit. Horns shall produce a sound rating of at least 85 dBA at 3.05 m. Horns used in exterior locations shall be specifically listed or approved for outdoor use and be provided with metal housing and protective grilles.

2.6.3 Visual Notification Appliances

Visual notification appliances shall conform to the applicable requirements of UL 1971 and the contract drawings. Appliances shall have clear high intensity optic lens, xenon flash tubes, and output white light. Strobe flash rate shall be between 1 to 3 flashes per second and a minimum of 110 candela. Strobe shall be surface or flush mounted at gypsum board locations.

2.6.4 Combination Audible/Visual Notification Appliances

Combination audible/visual notification appliances shall provide the same requirements as individual units except they shall mount as a unit in standard backboxes. Units shall be factory assembled. Any other audible

notification appliance employed in the fire alarm systems shall be approved by the Contracting Officer.

2.7 FIRE DETECTION AND ALARM SYSTEM PERIPHERAL EQUIPMENT

2.7.1 Conduit

Conduit and fittings shall comply with NFPA 70, UL 6, UL 1242, and UL 797; 21 mm C minimum.

2.7.2 Wiring

Wiring shall conform to NFPA 70. Wiring for 120 Vac power shall be No. 12 AWG minimum. The SLC wiring shall be copper cable in accordance with the manufacturers requirements. Wiring for fire alarm dc circuits shall be No. 14 AWG minimum. Voltages shall not be mixed in any junction box, housing, or device, except those containing power supplies and control relays. Wiring shall conform to NFPA 70. System field wiring shall be solid copper and installed in metallic conduit or electrical metallic tubing, except that rigid plastic conduit may be used under slab-on-grade. Conductors shall be color coded. Conductors used for the same functions shall be similarly color coded. Wiring code color shall remain uniform throughout the circuit. Pigtail or T-tap connections to initiating device circuits, supervisory alarm circuits, and notification appliance circuits are prohibited.

2.7.3 Special Tools and Spare Parts

Software, connecting cables and proprietary equipment, necessary for the maintenance, testing, and reprogramming of the equipment shall be furnished to the Contracting Officer. Two spare fuses of each type and size required shall be furnished. Two percent of the total number of each different type of detector, but no less than two each, shall be furnished. Spare fuses shall be mounted in the fire alarm panel.

2.8 TRANSMITTERS

2.8.1 Radio Alarm Transmitters

Transmitters shall be compatible with proprietary supervising station receiving equipment. Each radio alarm transmitter shall be the manufacturer's recognized commercial product, completely assembled, wired, factory tested, and delivered ready for installation and operation. Transmitters shall be provided in accordance with applicable portions of NFPA 72, NFPA 1221, and 47 CFR 15. Transmitter electronics module shall be contained within the physical housing as an integral, removable assembly. The transmitter shall operate on VHF frequency. The proprietary supervising station receiving equipment is Radionics D9000 and the transceiver shall be fully compatible with this equipment.

2.8.1.1 Transmitter Power Supply

Each radio alarm transmitter shall be powered by a combination of locally available 120-volt ac power and a sealed, lead-calcium battery.

- a. Operation: Each transmitter shall operate from 120-volt ac power. In the event of 120-volt ac power loss, the transmitter shall automatically switch to battery operation. Switchover shall be accomplished with no interruption of protective service, and shall

automatically transmit a trouble message. Upon restoration of ac power, transfer back to normal ac power supply shall also be automatic.

- b. Battery Power: Transmitter standby battery capacity shall provide sufficient power to operate the transmitter in a normal standby status for a minimum of 72 hours and be capable of transmitting alarms during that period.

2.8.1.2 Radio Alarm Transmitter Housing

Transmitter housing shall be NEMA 3R Type 316 stainless steel. The housing shall contain a lock that is keyed identical to the fire alarm system for the building. Radio alarm transmitter housing shall be factory painted with a suitable priming coat and not less than two coats of a hard, durable weatherproof enamel.

2.8.1.3 Antenna

The Contractor shall provide omnidirectional, coaxial, halfwave dipole antennas for radio alarm transmitters with a driving point impedance to match transmitter output. The antenna and antenna mounts shall be corrosion resistant and designed to withstand wind velocities of 161 km/h. Antennas shall not be mounted to any portion of the building roofing system. Determine optimum antenna location by using an antenna location tester.

2.9 GRAPHIC ANNUNCIATOR

2.9.1 Graphic Annunciator Panel

Provide a graphic annunciator which indicates the building floor plan, including the locations of all stairs and elevators. Stairs and elevators shall be identified by number. Alarm circuit boundaries shall be clearly marked on the floor plan. Annunciator shall include a north arrow, location of the fire alarm control panel, deluge panel, pre-action panel, and a "you are here" indicator. The graphic annunciator shall be a minimum size of 915 mm by 915 mm. Panel shall duplicate annunciation functions performed by the main fire alarm control panel, deluge panel and pre-action panel. Fire alarm zone descriptions shall correspond to the fire alarm control panel zones, deluge panel zones, pre-action panel zones, and light when the corresponding fire alarm control panel zones, deluge panel zones and pre-action panel zones are activated respectively. Panel shall be surface-mounted.

2.9.2 Indicating Lights

Provide the graphic annunciator with individual LED indicating lights for each type of alarm and supervisory device. Provide an amber LED for indicating a system trouble condition and a separate amber LED for indicating a supervisory condition. Provide a green LED to indicate presence of power and a red LED to indicate an alarm condition. The actuation of any alarm signal shall cause the illumination of a device LED. System supervisory or trouble shall cause the illumination of a trouble LED.

2.9.3 Programming

Where programming for the operation of the proper LEDs is accomplished by a separate software program than the software for the fire alarm control

panel, the software program shall not require reprogramming after loss of power. The software shall be reprogrammable in the field.

PART 3 EXECUTION

3.1 INSTALLATION

All work shall be installed as shown and in accordance with the manufacturer's diagrams and recommendations, unless otherwise specified. Smoke detectors shall not be installed until construction is essentially complete and the building has been thoroughly cleaned.

3.1.1 Power Supply for the System

A single dedicated circuit connection for supplying power from a branch circuit to each building fire alarm system shall be provided. The power shall be supplied as shown on the drawings. The power supply shall be equipped with a locking mechanism and marked in red with the words "FIRE ALARM CIRCUIT CONTROL".

3.1.2 Wiring

Conduit size for wiring shall be in accordance with NFPA 70. Wiring for the fire alarm system shall not be installed in conduits, junction boxes, or outlet boxes with conductors of lighting and power systems. Not more than two conductors shall be installed under any device screw terminal. The wires under the screw terminal shall be straight when placed under the terminal then clamped in place under the screw terminal. The wires shall be broken and not twisted around the terminal. Circuit conductors entering or leaving any mounting box, outlet box enclosure, or cabinet shall be connected to screw terminals with each terminal and conductor marked in accordance with the wiring diagram. Connections and splices shall be made using screw terminal blocks. The use of wire nut type connectors in the system is prohibited. Wiring within any control equipment shall be readily accessible without removing any component parts. The fire alarm equipment manufacturer's representative shall be present for the connection of wiring to the control panel.

3.1.3 Control Panel

The control panel and its assorted components shall be mounted so that no part of the enclosing cabinet is less than 300 mm nor more than 2000 mm above the finished floor. Manually operable controls shall be between 900 and 1100 mm above the finished floor. Panel shall be installed to comply with the requirements of UL 864.

3.1.4 Detectors

Detectors shall be located and installed in accordance with NFPA 72. Detectors shall be connected into signal line circuits or initiating device circuits as indicated on the drawings. Detectors shall be at least 300 mm from any part of any lighting fixture. Detectors shall be located at least 900 mm from diffusers of air handling systems. Each detector shall be provided with appropriate mounting hardware as required by its mounting location. Detectors which mount in open space shall be mounted directly to the end of the stubbed down rigid conduit drop. Conduit drops shall be firmly secured to minimize detector sway. Where length of conduit drop from ceiling or wall surface exceeds 900 mm, sway bracing shall be provided. Detectors installed in concealed locations (above ceiling,

raised floors, etc.) shall have a remote visible indicator LED/LCD in a finished, visible location.

3.1.5 Notification Appliances

Notification appliances shall be mounted 2003 mm above the finished floor or 150 mm below the ceiling, whichever is lower.

3.1.6 Annunciator Equipment

Annunciator equipment shall be mounted where indicated on the drawings.

3.1.7 Addressable Initiating Device Circuits Module

The initiating device circuits module shall be used to connect supervised conventional initiating devices (water flow switches, water pressure switches, manual fire alarm stations, high/low air pressure switches, and tamper switches). The module shall mount in an electrical box adjacent to or connected to the device it is monitoring and shall be capable of Style B supervised wiring to the initiating device. In order to maintain proper supervision, there shall be no T-taps allowed on style B lines. Addressable initiating device circuits modules shall monitor only one initiating device each. Contacts in suppression systems and other fire protection subsystems shall be connected to the fire alarm system to perform supervisory and alarm functions as specified in Section 13852 FIRE ALARM REPORTING SYSTEM, RADIO TYPE, Section 13930 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION, and Section 13945 PREACTION AND DELUGE SPRINKLER SYSTEMS, FIRE PROTECTION, as indicated on the drawings and as specified herein.

3.1.8 Addressable Control Module

Addressable and control modules shall be installed in the outlet box or adjacent to the device they are controlling. If a supplementary suppression releasing panel is provided, then the monitor modules shall be mounted in a common enclosure adjacent to the suppression releasing panel and both this enclosure and the suppression releasing panel shall be in the same room as the releasing devices. All interconnecting wires shall be supervised unless an open circuit or short circuit abnormal condition does not affect the required operation of the fire alarm system. If control modules are used as interfaces to other systems, such as HVAC or elevator control, they shall be within the control panel or immediately adjacent to it. Control modules that control a group of notification appliances shall be adjacent to the first notification appliance in the notification appliance circuits. Control modules that connect to devices shall supervise the notification appliance circuits. Control modules that connect to auxiliary systems or interface with other systems (non-life safety systems) and where not required by NFPA 72, shall not require the secondary circuits to be supervised. Contacts in suppression systems and other fire protection subsystems shall be connected to the fire alarm system to perform required alarm functions as specified in Section 13852 FIRE ALARM REPORTING SYSTEM, RADIO TYPE, Section 13930 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION, and Section 13945 PREACTION AND DELUGE SPRINKLER SYSTEMS, FIRE PROTECTION, as indicated on the drawings and as specified herein.

3.2 OVERVOLTAGE AND SURGE PROTECTION

3.2.1 Power Line Surge Protection

All equipment connected to alternating current circuits shall be protected from surges per IEEE C62.41 B3 combination waveform and NFPA 70. Fuses shall not be used for surge protection. The surge protector shall be rated for a maximum let thru voltage of 350 Volts ac (line-to-neutral) and 350 Volt ac (neutral-to-ground).

3.2.2 Low Voltage DC Circuits Surge Protection

All IDC, NAC, and communication cables/conductors, except fiber optics, shall have surge protection installed at each point where it exits or enters a building. Equipment shall be protected from surges per IEEE C62.41 B3 combination waveform and NFPA 70. The surge protector shall be rated to protect the 24 Volt dc equipment. The maximum dc clamping voltages shall be 36 V (line-to-ground) and 72 Volt dc (line-to-line).

3.2.3 Signal Line Circuit Surge Protection

All SLC cables/conductors, except fiber optics, shall have surge protection/isolation circuits installed at each point where it exits or enters a building. The circuit shall be protected from surges per IEEE C62.41 B3 combination waveform and NFPA 70. The surge protector/isolator shall be rated to protect the equipment.

3.3 GROUNDING

Grounding shall be provided by connecting to building ground system.

3.4 SUPERVISING STATION PROVISIONS AT HICKAM FIRE DEPARTMENT, BUILDING 2036

The proprietary type Supervising Station (PSS) is located at the Hickam Fire Department, Building 2036. The supervising base radio equipment is existing and consists of a Radionics D9000 System.

3.4.1 Additions to Existing Supervising Station Base Radio Equipment at Hickam Fire Department Building 2036

Supplemental components shall be added to the existing supervising base radio equipment as required to accommodate the new fire alarm system to be installed at the protected premises. All present functions shall be extended, including recording and storage in memory, and programming shall be updated if required to accommodate the revised configuration. Acceptance testing shall include procedures that would demonstrate that operation of existing equipment has not been degraded and that the expanded configuration operates compatibly with the new fire alarm system.

3.5 TESTING

The Contractor shall notify the Contracting Officer at least 10 days before the preliminary and acceptance tests are to be conducted. The tests shall be performed in accordance with the approved test procedures in the presence of the Contracting Officer. The control panel manufacturer's representative shall be present to supervise tests. The Contractor shall furnish instruments and personnel required for the tests.

3.5.1 Preliminary Tests

Upon completion of the installation, the system shall be subjected to functional and operational performance tests including tests of each

installed initiating and notification appliance, when required. Tests shall include the meggering of system conductors to determine that the system is free from grounded, shorted, or open circuits. The megger test shall be conducted prior to the installation of fire alarm equipment. If deficiencies are found, corrections shall be made and the system shall be retested to assure that it is functional. After completing the preliminary testing the Contractor shall complete and submit the NFPA 72, Certificate of Completion.

3.5.2 Acceptance Test

Acceptance testing shall not be performed until the Contractor has completed and submitted the Certificate of Completion. Testing shall be in accordance with NFPA 72. The recommended tests in NFPA 72 shall be considered mandatory and shall verify that previous deficiencies have been corrected. The Contractor shall complete and submit the NFPA 72, Inspection and Testing Form. Transatlantic Programs Center, P. O. Box 2250, Winchester, Virginia 22604; Mr. KC Kochhar (540) 665-3907 must be present during this test and must approve the test. The test shall include all requirements of NFPA 72 and the following:

- a. Test of each function of the control panel.
- b. Test of each circuit in both trouble and normal modes.
- c. Tests of each alarm initiating devices in both normal and trouble conditions.
- d. Tests of each control circuit and device.
- e. Tests of each alarm notification appliance.
- f. Tests of the battery charger and batteries.
- g. Complete operational tests under emergency power supply.
- h. Visual inspection of wiring connections.
- i. Opening the circuit at each alarm initiating device and notification appliance to test the wiring supervisory feature.
- j. Ground fault
- k. Short circuit faults
- l. Stray voltage
- m. Loop resistance

3.6 TRAINING

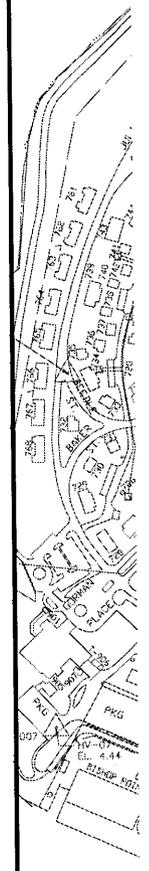
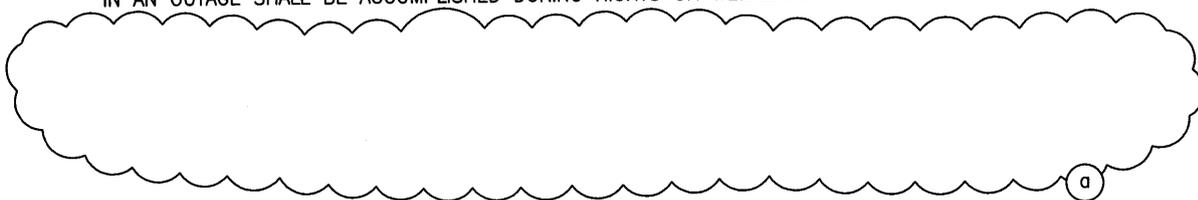
Training course shall be provided for the operations and maintenance staff. The course shall be conducted in the building where the system is installed or as designated by the Contracting Officer. The training period for systems operation shall consist of 1 training day (8 hours) and shall start after the system is functionally completed but prior to final acceptance tests. The training period for systems maintenance shall consist of 2 training days (8 hours per day) and shall start after the system is functionally completed but prior to final acceptance tests. The

instructions shall cover items contained in the operating and maintenance instructions. In addition, training shall be provided on performance of expansions or modifications to the fire detection and alarm system. The training period for system expansions and modifications shall consist of at least 1 training day (8 hours) and shall start after the system is functionally completed but prior to final acceptance tests.

-- End of Section --

GENERAL NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DETAILS OF WORK, WORKING CONDITIONS, AND DIMENSIONS BEFORE PERFORMING ANY WORK AND SHALL BE RESPONSIBLE FOR THE PROPER RELATION OF ALL NEW WORK TO THE EXISTING BUILDING STRUCTURE.
2. CONTRACTOR SHALL RESTORE & REPAINT ALL EXISTING SURFACES AFFECTED BY HIS WORK TO THEIR ORIGINAL CONDITION OR BETTER.
3. THE CONTRACTOR SHALL INSPECT THE PROJECT SITE BEFORE PROCEEDING WITH THE WORK AND SHALL NOTIFY AND COORDINATE WITH THE CONTRACTING OFFICERS FOR ANY MAJOR DEVIATIONS OR DISCREPANCIES FROM THE PLANS DUE TO UNFORESEEN OR VARYING FIELD CONDITIONS.
4. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL AND EQUIPMENT INCLUDING CUTTING AND PATCHING AS REQUIRED FOR COMPLETE AND OPERATING SYSTEMS.
5. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO COVER THE COMPLETE INSTALLATION OF SYSTEMS TO FUNCTION AS DESCRIBED. THE OMISSION OF REFERENCE TO ANY NECESSARY ITEM OF LABOR OR MATERIAL SHALL NOT RELIEVE THE CONTRACTOR FROM PROVIDING SUCH LABOR AND MATERIAL. DRAWINGS DO NOT ATTEMPT TO SHOW EXACT DETAILS OF PIPING. ARRANGE AND LOCATE PIPING TO MAINTAIN ADEQUATE CLEARANCES TO SERVICE EQUIPMENT AND TO PROVIDE 2134mm HEAD ROOM IN AISLES AND WALKWAYS. PROVIDE OFFSETS AS NECESSARY TO AVOID LOCAL OBSTRUCTIONS OR INTERFERENCES WITH OTHER TRADES. SHOULD PROJECT CONDITIONS REQUIRE REARRANGEMENT OF WORK, THE CONTRACTOR SHALL MARK SUCH CHANGES ON THE RECORD DRAWINGS. IF THESE CHANGES REQUIRE ALTERNATE METHODS TO THOSE APPROVED BY THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL SUBMIT DRAWINGS SHOWING THE PROPOSED ALTERNATE METHODS TO THE CONTRACTING OFFICER. THE CONTRACTOR SHALL NOT PROCEED UNTIL APPROVAL IS OBTAINED.
6. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CONTRACTING OFFICER BEFORE MAKING ANY PENETRATIONS THROUGH STRUCTURAL MEMBERS, WALLS, AND SLABS. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS INCLUDING CALCULATIONS SIGNED BY A LICENSED STRUCTURAL ENGINEER STATING THAT ANY SUCH PENETRATION WILL NOT ADVERSELY EFFECT THE STRUCTURAL INTEGRITY OF THE STRUCTURE.
7. CONTRACTOR SHALL MAKE ALL PROVISIONS TO PROTECT ALL EXISTING EQUIPMENT FROM DAMAGE. THE CONTRACTOR SHALL RESTORE ANY EXISTING CONSTRUCTION DAMAGED BY HIS WORK TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
8. UTILITY OUTAGES WILL NOT BE ALLOWED DURING NORMAL WORKING HOURS UNLESS OTHERWISE APPROVED IN WRITING BY THE CONTRACTING OFFICER. ALL CONNECTIONS TO THE EXISTING UTILITY SYSTEM THAT WILL RESULT IN AN OUTAGE SHALL BE ACCOMPLISHED DURING NIGHTS OR WEEKENDS.



DESCRIPTION OF SCOPE OF WORK

REFERENCE SHEET: T1.0 (ZONES B5, B6)



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FY01 MCP KNMD 983001
UPGRADE HANGAR COMPLEX
HICKAM AIR FORCE BASE
OAHU, HAWAII

PREPARED BY: CEDRIC D.O. CHONG & ASSOCIATES, INCORPORATED INITIALS: BJO
DRAWING DATE: 25 MAY 01

DRAWING NO.

SKM-1

CUT & PATCH SLAB FOR
INSTALLATION OF NEW AIR
PIPING (TYP.)

STORAGE
(CONDEMNED W/0
LEAN-TO
STRUCTURE)

TROUBLE ALARM
PANEL FOR SUMP
PUMPS

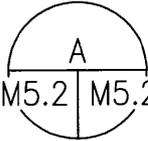
(a)

HANG
STORAGE

NEW U/G CA LINE TO
PNEUMATIC CONTROL
VALVE IN VALVE PIT
SEE SHEET M1.0 FOR
CONTINUATION

CA (DN)

HANG
STORAGE

NEW PNEUMATIC
VALVE CONTROL PANEL
FOR TRAP PIT VALVE SEE  FOR ELEVATION

REFERENCE SHEET: M5.2 (ZONE B6)



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OAHU, HAWAII

PREPARED BY: CEDRIC D.O. CHONG & ASSOCIATES, INCORPORATED
DRAWING DATE: 25 MAY 01

INITIALS: BJO

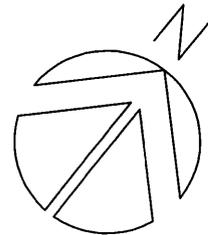
DRAWING NO.

SKM-2

FD

AIR HOSE/CABLE TRENCH &
TRENCH DRAINS SEE
STRUCTURAL FOR DETAILS
(ADDITIVE BID OPTION NO. 4)

NEW TRENCH DRAIN. SEE
ARCH. & STRUCT.
DRAWINGS FOR DETAILS



M4.14

NOTE:

CABLE/AIR HOSE TRENCHES BEING PROVIDED UNDER
ADDITIVE BID OPTION NO. 4 ARE FOR USER
COMPRESSED AIR HOSES AND ELECTRICAL CABLING
USED DURING AIRCRAFT MAINTENANCE.

a

REFERENCE SHEET: M5.2 (ZONE A5)



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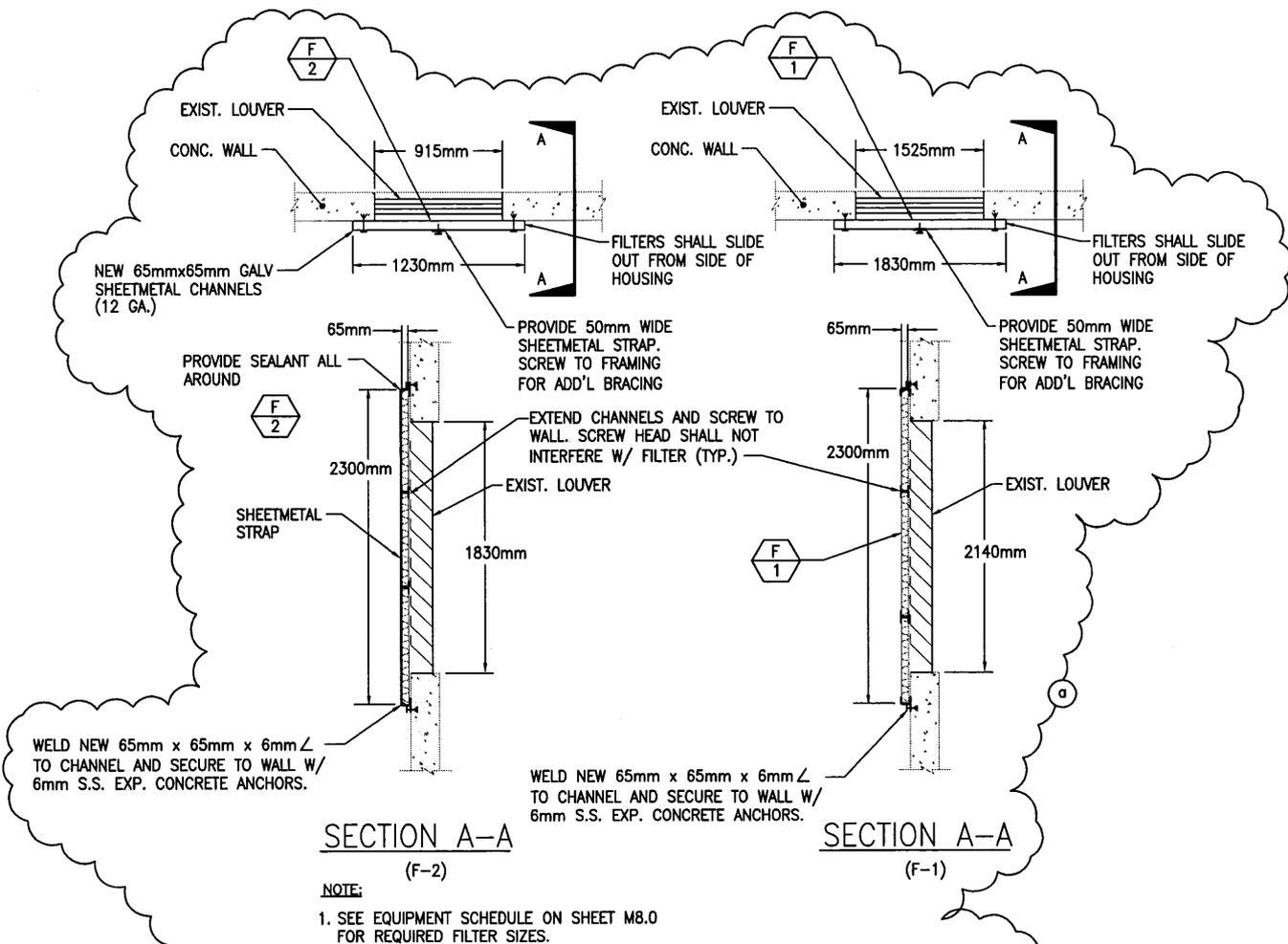
FY01 MCP KNMD 983001
UPGRADE HANGAR COMPLEX
HICKAM AIR FORCE BASE
OAHU, HAWAII

PREPARED BY: CEDRIC D.O. CHONG & ASSOCIATES, INCORPORATED INITIALS: BJO
DRAWING DATE: 25 MAY 01

DRAWING NO.

SKM-3

4
M2.3 | M2.15 NOT TO SCALE
TYP. EXHAUST FAN DETAIL

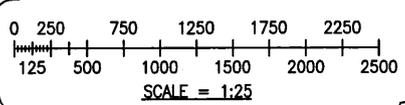


SECTION A-A
(F-2)

SECTION A-A
(F-1)

NOTE:
1. SEE EQUIPMENT SCHEDULE ON SHEET M8.0 FOR REQUIRED FILTER SIZES.

7
M2.1 | M2.2 SCALE: 1:25
CUSTOM SHOP FABRICATED FILTER RACK DETAILS



REFERENCE SHEET: M2.15 (ZONES B1,B2,C1,C2)

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DRAWING DATE: 25 MAY 01

DRAWING NO.
SKM-4

DELUGE RISER SURGE ARRESTOR SCHEDULE

UNIT	VOLUME (LITERS)	MAX. WORKING PRESSURE (Kpa)	DIMENSIONS			FLUID	MAX. SURGE (Kpa)	MIN. SURGE (Kpa)	STATIC ELEV. ● ARRESTOR (CM)
			OD (mm)	HT. (mm)	SYSTEM CONNECTION (mm)				
ST-D-1	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-2	30	3500	220	760	75	H ₂ O	1380	900	400
ST-D-3	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-4	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-5	40	3500	220	1300	75	H ₂ O	1380	900	400
ST-D-6	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-7	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-8	40	3500	220	1300	75	H ₂ O	1380	900	400
ST-D-9	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-10	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-11	30	3500	220	760	75	H ₂ O	1380	900	400
ST-D-12	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-13	40	3500	220	1300	75	H ₂ O	1380	900	400
ST-D-14	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-15	30	3500	220	760	75	H ₂ O	1380	900	400
ST-D-16	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-17	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-18	40	3500	220	1300	75	H ₂ O	1380	900	400
ST-D-19	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-20	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-21	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-22	40	3500	220	1300	75	H ₂ O	1380	900	400
ST-D-23	10	3500	220	500	75	H ₂ O	1380	900	400
ST-D-24	30	3500	220	760	75	H ₂ O	1380	900	400
ST-D-25	10	3500	220	500	75	H ₂ O	1380	900	400

REFERENCE SHEET: M8.0 (ZONES B3,C3,D3)



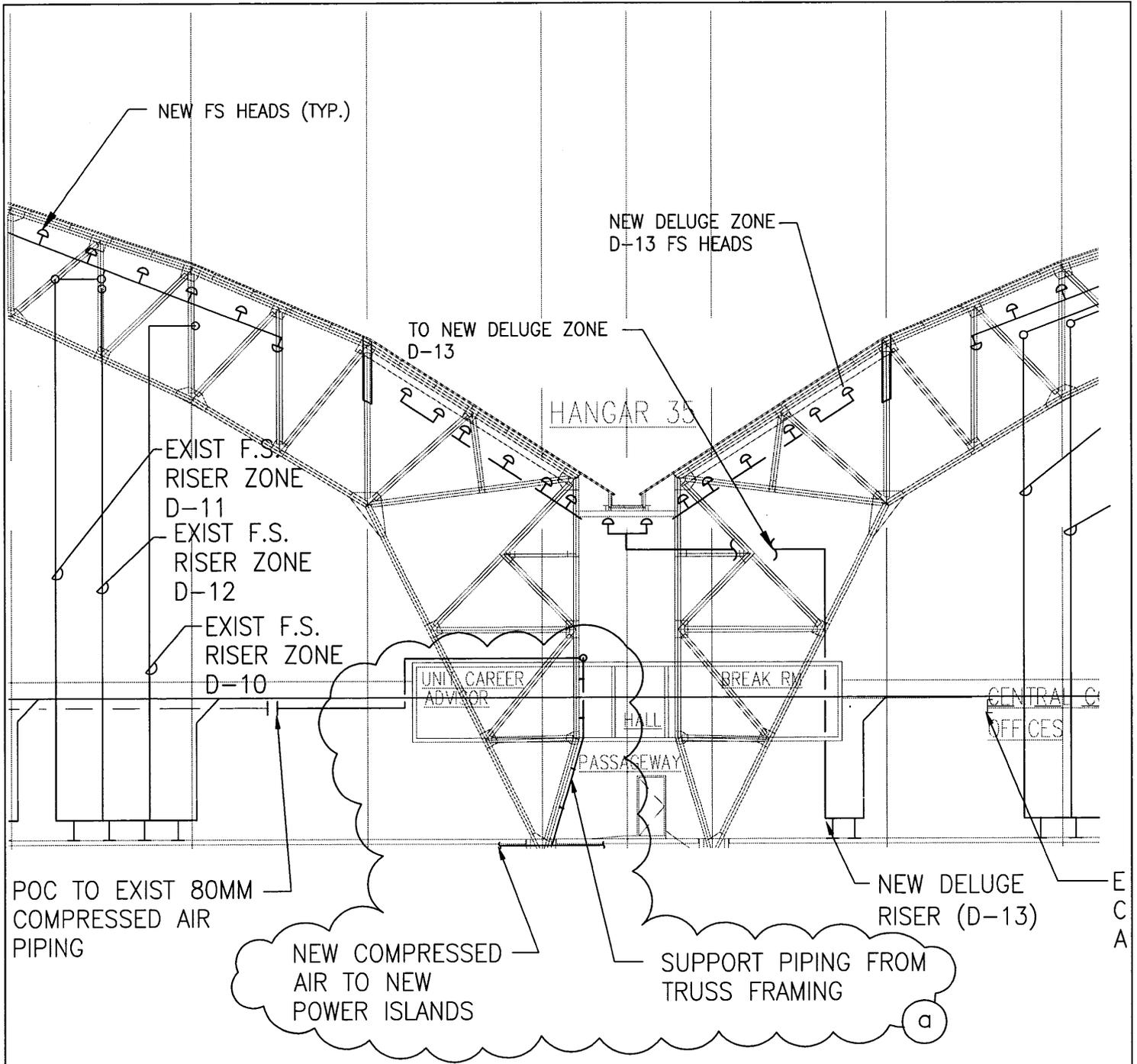
CEDRIC D.O. CHONG & ASSOCIATES, INCORPORATED
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 828 Fort Street Mail Suite 500, Honolulu, Hawaii 96813
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FY01 MCP KNMD 983001
 UPGRADE HANGAR COMPLEX
 HICKAM AIR FORCE BASE
 OAHU, HAWAII

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 DRAWING DATE: 25 MAY 01

DRAWING NO.

SKM-5



A
HANGAR 35 SECTION A
 M5.2 | M6.0 SCALE: 1:150

REFERENCE SHEET: M6.0 (ZONE C4)

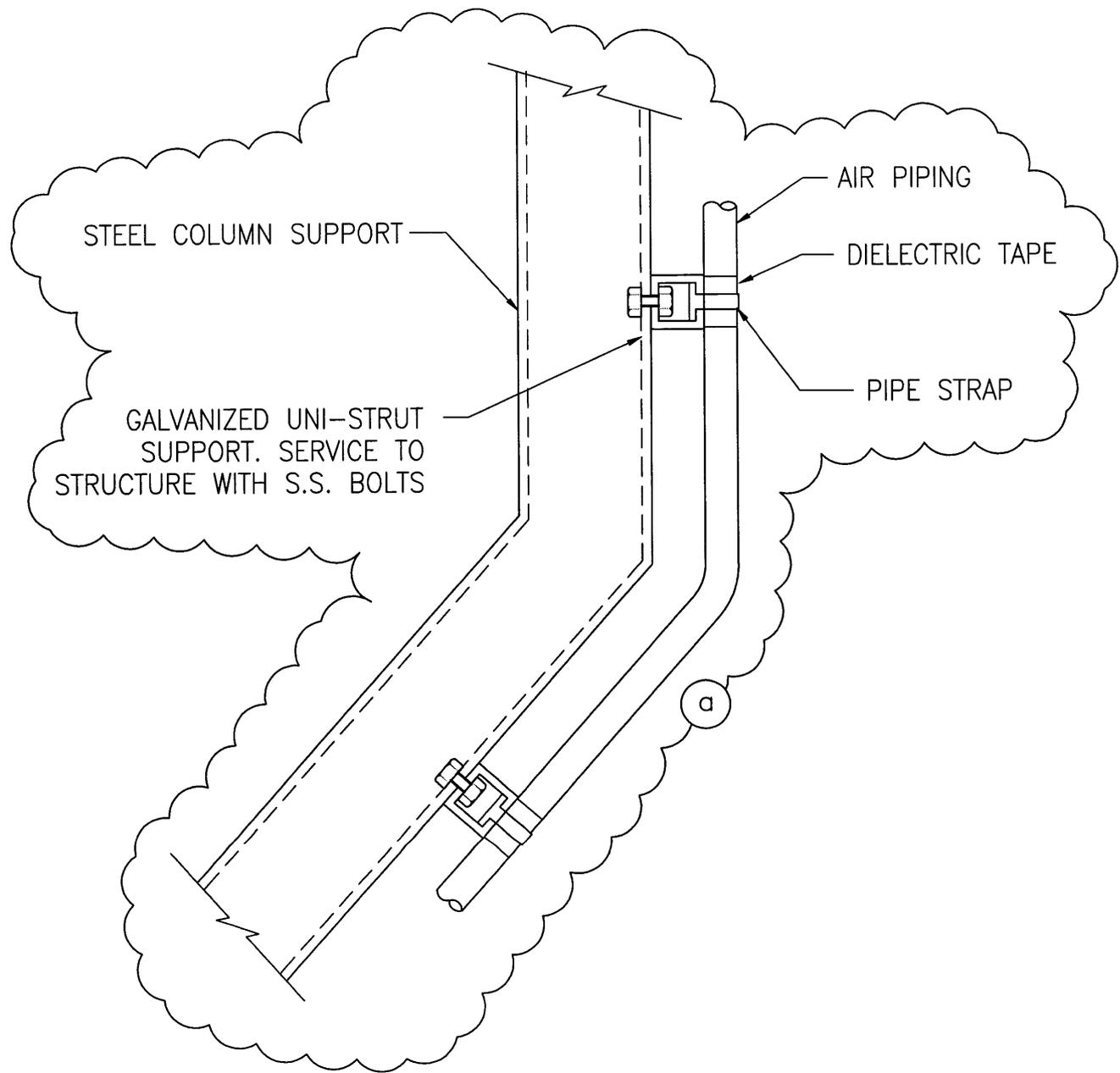

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 DRAWING DATE: 25 MAY 01

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SKM-6



VERTICAL PIPING

COMPRESSED AIR PIPING SUPPORT DETAIL

NOT TO SCALE

REFERENCE SHEET: M7.5 (ZONES A2,A3,B2,B3)



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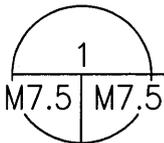
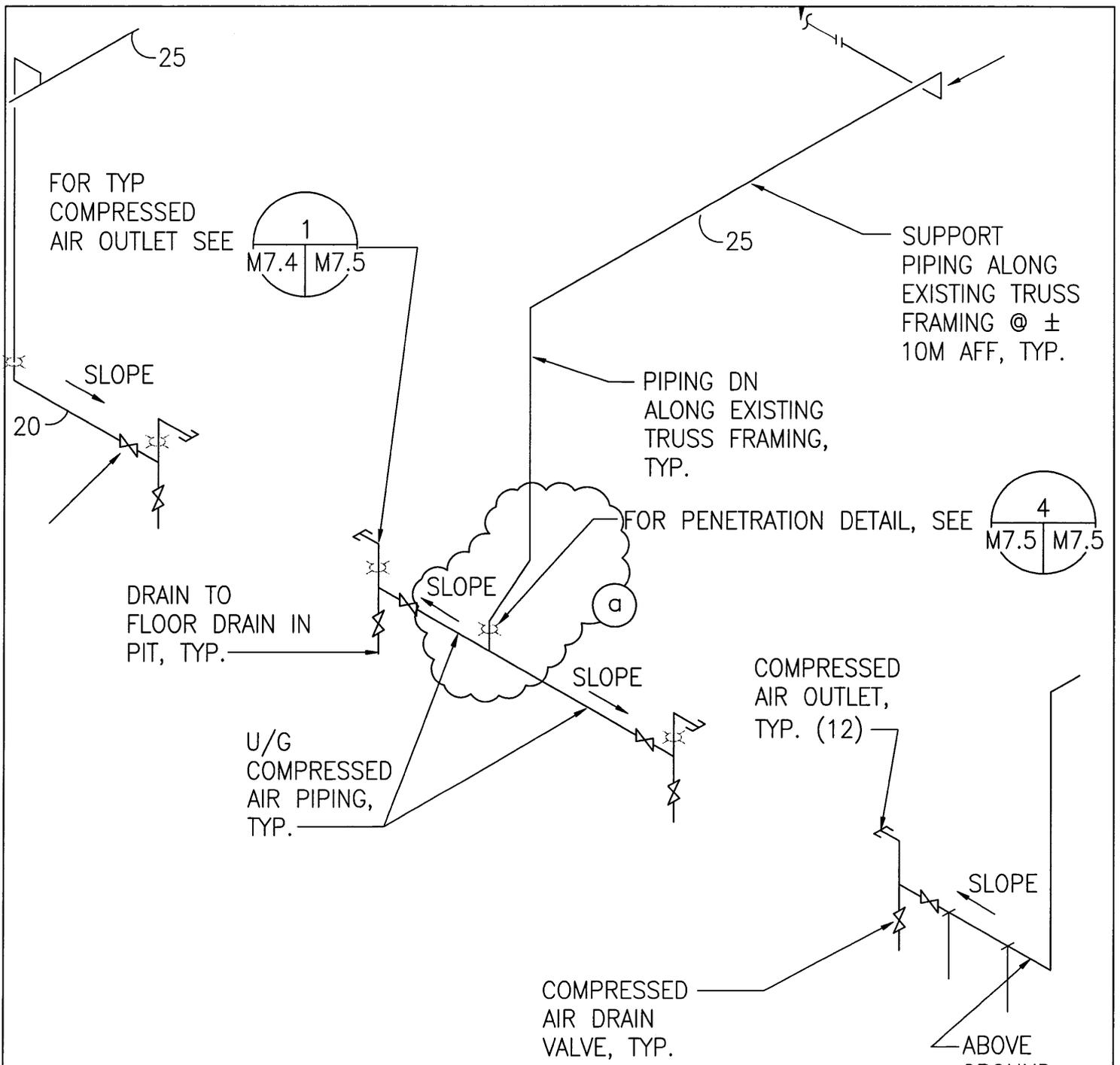
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INITIALS: BJO

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SKM-7



COMPRESSED AIR PIPING DIAGRAM

NOT TO SCALE

REFERENCE SHEET: M7.5 (ZONES C4,C5)



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 DRAWING DATE: 25 MAY 01

DRAWING NO.

SKM-8