

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE	PAGE OF PAGES 1 110
2. AMENDMENT/MODIFICATION NO. 0003		3. EFFECTIVE DATE 27 OCT 2020	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)	
6. ISSUED BY CODE U.S Army Corps of Engineers, Los Angeles Dist CESPL-CT-E, East Region Branch 915 Wilshire Blvd. Los Angeles, CA 90017		7. ADMINISTERED BY (If other than Item 6) SEE ITEM 6	8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)		
CODE		FACILITY CODE	(X)	9A. AMENDMENT OF SOLICITATION NO. W912PL-21-B-0002	
			<input type="checkbox"/>	9B. DATED (SEE ITEM 11) 18 September 2020	
			<input type="checkbox"/>	10A. MODIFICATION OF CONTRACT/ORDER NO.	
			<input type="checkbox"/>	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.

Offers 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 1 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 ACKNOWLEDGMENT 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 your 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 ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

CHECK ONE	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.
<input type="checkbox"/>	
<input type="checkbox"/>	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).
<input type="checkbox"/>	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
<input type="checkbox"/>	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

FY18 GROUND TRANSPORT EQUIPMENT FACILITY, FORT HUACHUCA, AZ

SEE CONTINUATION PAGE FOR AMENDMENT 0003 SUMMARY OF CHANGES.

PLEASE BE ADVISED THAT DOD SAFE DROP-OFF CODES EXPIRE IN 14 DAYS. ALL BIDDERS MUST REQUEST A NEW CODE IF THEIR EXISTING CODE WILL EXPIRE BEFORE BID SUBMITTAL.

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 CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR		16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

GROUND TRANSPORTATION EQUIPMENT BUILDING (GTBE) FORT HUACHUCA
AMENDMENT 0003 SUMMARY OF CHANGES

SPECIFICATIONS:

1. Revise Table of Contents Page 5 adding an Appendices Section and
 - a. Appendix 1. Hazardous Material Reports for Existing Motor Pool buildings to be demolished. NOTE: Contractor to bid based on info in that attached test results. If no results are available for a building, for bidding purposes, contractor shall assume no HAZMAT. HOWEVER, contractor is responsible for performing HAZMAT testing on all buildings to be demo'ed. Any discrepancies resulting from contractor testing will be addressed via Changes clause.
 - b. Appendix 2. Fort Huachuca Fire Department requirements. Note; these items are required for work under this contract.
2. Revise Section 01 57 20 Paragraph 3.18 regarding UXO monitors.
3. Revise CD-101 with FH Fire Department Requirements note.
4. Revise Drawing CD-104 adding Notes 5-9.
5. Revise Drawing C-510 showing fence fabric at 8 feet high.
6. Revise Drawing A-102 and add Drawing A-102a.
7. Revise Drawing A-620; A-640 and A-641.
8. Revise Drawing M-602 clarifying "Option" requirements.
9. Revise E-601 Note for wire size from DP-1 to XP-1.
10. Revise Drawing FA-601 adding Note 6 on Fire Alarm Panel requirement (Monaco).
11. Revise a series of Electrical drawings; E-001; EP-102; EG-102; E-401; E-402; E-504; 101; T-102; T-103; T-501; T-502; T-601.
12. SF-1442. Change Bid due date from 30 October 2020 to 6 November 2020 12PM PST.

SOLICITATION, OFFER, AND AWARD <i>(Construction, Alteration, or Repair)</i>	1. SOLICITATION NUMBER	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	W912PL21B0002	<input checked="" type="checkbox"/> SEALED BID (IFB) <input type="checkbox"/> NEGOTIATED (RFP)	18 SEP 2020	1 OF

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

4. CONTRACT NUMBER	5. REQUISITION/PURCHASE REQUEST NUMBER	6. PROJECT NUMBER
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7. ISSUED BY USACE, Los Angeles District Contracting Division, West Region Branch 915 Wilshire Blvd Los Angeles, CA 90017	CODE	8. ADDRESS OFFER TO DoD Secure Access File Exchange (DoD Safe) at https://safe.apps.mil/ See Section 00 22 13, Special Instructions Pertaining to Submission of Electronic Bids
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9. FOR INFORMATION CALL	A. NAME JIMMY L. BARTON	B. TELEPHONE NUMBER (Include area code) (NO COLLECT CALLS) 213.452.3251
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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 number, date):
FY18 GROUND TRANSPORT EQUIPMENT FACILITY, FORT HUACHUCA, AZ

This a fully designed project (Design Bid Build). Construct a Ground Transport Equipment Building Complex. Project includes a vehicle maintenance shop (ground transport equipment building), organizational storage building, organizational vehicle parking, vehicle wash platform, vehicle loading dock, petroleum, oils and lubricants (POL) storage, and other hazardous waste/material storage. The vehicle maintenance facility will include mechanical and electrical rooms, telecommunications, HVAC, fire detection and sprinkler suppression systems, building information systems, intrusion detection system (IDS) installation, integrated energy, monitoring and control system (EMCS) connected to the base monitoring systems, and the installation of fire alarm systems. Supporting facilities will include connection to all utilities, lighting, paving, parking areas, sidewalks, curbs and gutters, rainwater harvesting systems, and signage. Heating and air conditioning will be provided by self-contained systems.

The estimated magnitude of project is between \$25,000,000 and \$100,000,000. This solicitation is UNRESTRICTED and all responsive and responsible parties are invited to submit a bid. The North American Industry Classification System (NAICS) code is 236220 Commercial and Institutional Building

BIDDERS PLEASE NOTE: "This project may be delayed, canceled or revised at any time prior to award."

11. The Contractor shall begin performance within 10 calendar days and complete it within * 00 73 00 calendar days after receiving award, notice to proceed. This performance period is mandatory, negotiable. (See *Section 00 73 00.)

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE 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 10
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13. ADDITIONAL SOLICITATION REQUIREMENTS:
- A. Sealed offers in original and 0 copies to perform the work required are due at the place specified in Item 8 by 12PM (hour) local time 06 NOV 2020 (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 reference.
 - 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.

OFFER (Must be fully completed by offeror)

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code) DUNS NO. : TAX ID NO. : CAGE CODE NO. : CODE FACILITY CODE	15. TELEPHONE NUMBER (Include area code) () - ; FAX () - 16. REMITTANCE ADDRESS (Include only if different than Item 14)
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17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. (Insert any number equal or greater than the minimum requirement stated in 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)

AMOUNTS

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGEMENT OF AMENDMENTS
 (The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)	20B. SIGNATURE	20C. OFFER DATE
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AWARD (To be completed by Government)

21. ITEMS ACCEPTED

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA
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24. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO <input type="checkbox"/> 10 U.S.C. 2304(c) () <input type="checkbox"/> 41 U.S.C. 253(c) ()
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26. ADMINISTERED BY CODE	27. PAYMENT WILL BE MADE BY USACE, Finance Center ATTN: CEFCO-AO-D 5722 Integrity Drive Millington, TN 38054-5005
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CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

<input type="checkbox"/> 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return _____ copies to the issuing office.) Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.	<input type="checkbox"/> 29. AWARD. (Contractor is not required to sign this document.) Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.
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30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)	31A. NAME OF CONTRACTING OFFICER (Type or print)
30B. SIGNATURE	31B. UNITED STATES OF AMERICA
30C. DATE	BY
	31C. AWARD DATE

DIVISION 27 - COMMUNICATIONS

27 05 14.00 10 CABLE TELEVISION PREMISES DISTRIBUTION SYSTEM
27 05 28.36 CABLE TRAYS FOR COMMUNICATIONS SYSTEMS
27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM
27 13 23 COMMUNICATIONS OPTICAL BACKBONE CABLING
27 51 16 RADIO AND PUBLIC ADDRESS SYSTEMS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 08 10 ELECTRONIC SECURITY SYSTEM ACCEPTANCE TESTING
28 10 05 ELECTRONIC SECURITY SYSTEMS (ESS)
28 31 49 CARBON MONOXIDE DETECTORS
28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM

DIVISION 31 - EARTHWORK

31 00 00 EARTHWORK
31 11 00 CLEARING AND GRUBBING

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 11 20 SUBBASES FOR FLEXIBLE PAVING
32 11 23 AGGREGATE BASE COURSES
32 12 10 BITUMINOUS TACK COAT
32 12 17 HOT MIX BITUMINOUS PAVEMENT
32 12 18 RESIN MODIFIED PAVEMENT SURFACING MATERIAL
32 16 13 CONCRETE SIDEWALKS AND CURBS AND GUTTERS
32 17 23 PAVEMENT MARKINGS
32 31 13.53 HIGH-SECURITY CHAIN LINK FENCES AND GATES

DIVISION 33 - UTILITIES

33 08 55 COMMISSIONING OF FUEL FACILITY SYSTEMS
33 11 00 WATER UTILITY DISTRIBUTION PIPING
33 30 00 SANITARY SEWERS
33 40 00 STORM DRAINAGE UTILITIES
33 51 13 NATURAL-GAS METERING
33 51 15 NATURAL-GAS DISTRIBUTION
33 56 10 FACTORY-FABRICATED FUEL STORAGE TANKS
33 58 00 LEAK DETECTION FOR FUELING SYSTEMS
33 71 02 UNDERGROUND ELECTRICAL DISTRIBUTION
33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP)

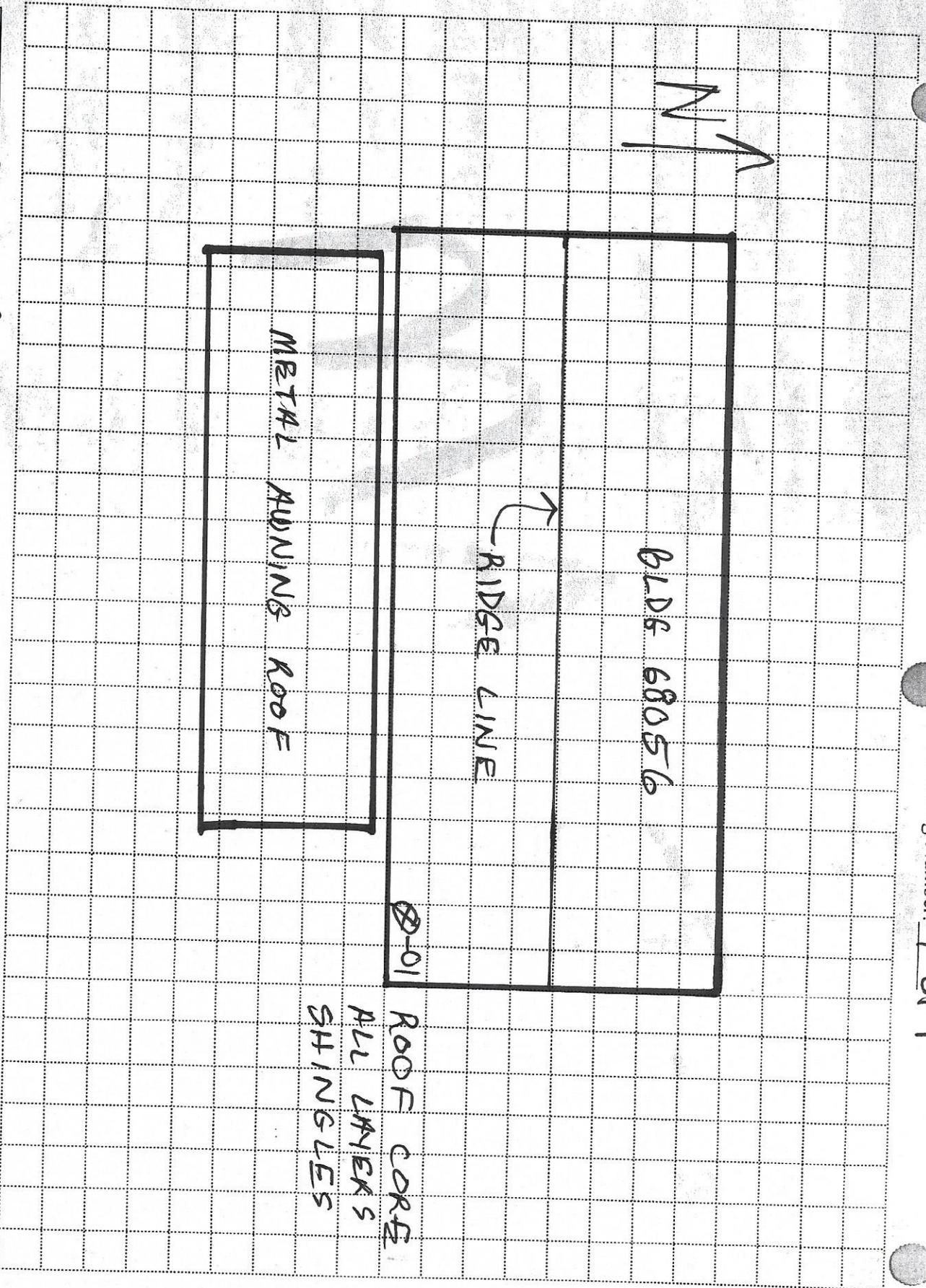
DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT

41 22 13.13 BRIDGE CRANES

APPENDICES

APPENDIX 1 HAZARDOUS MATERIAL REPORTS
APPENDIX 2 FORT HUACHUCA FIRE DEPARTMENT REQUIRMENTS

-- End of Table of Contents --



Address: EP&MP

Building: 68056

Homogeneous Area ID: ROOF

Functional space or room:

Scale:

Date:

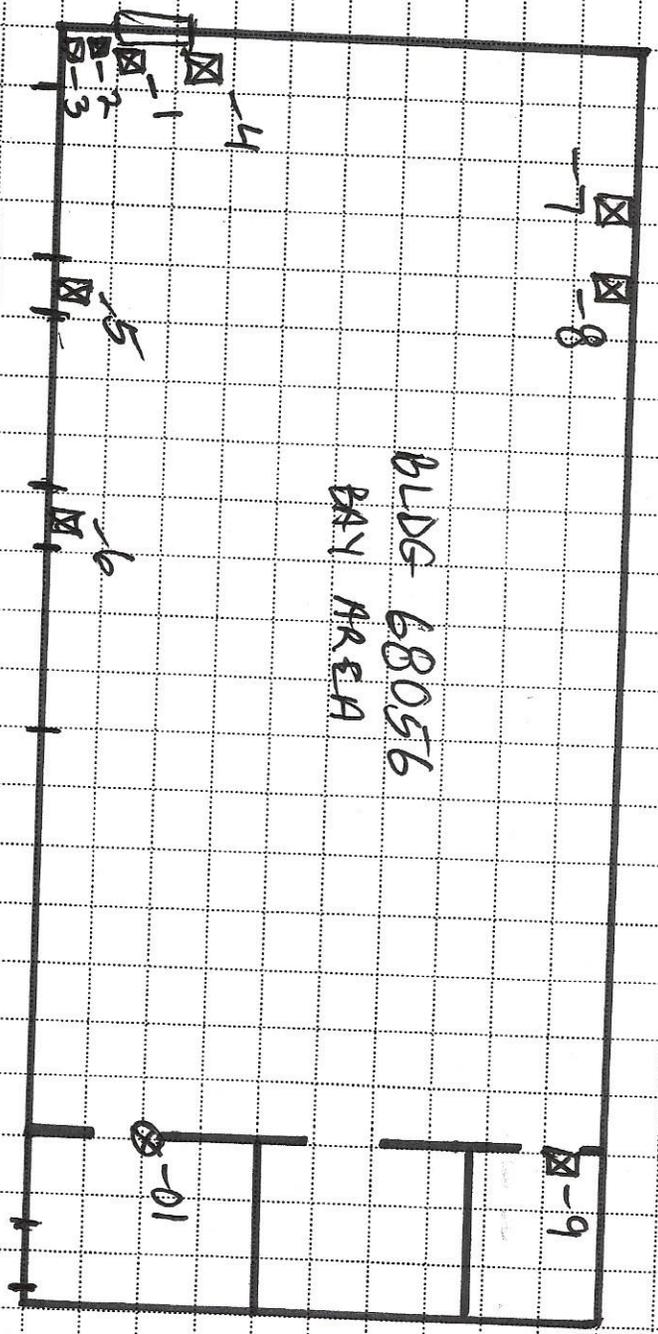
15 JAN 13

Inspector:

R. HARMS

Signature:

[Handwritten Signature]



- ⊗ ACM SAMPLE POINT
- ⊗ LBP SAMPLE POINTS

Address: **EPG MP**

Building: **68056**

Homogeneous Area ID:

Functional space or room:

Scale: **BAY AREA**

Date:

29 JAN 13

Inspector:

B. STANBES

Signature:

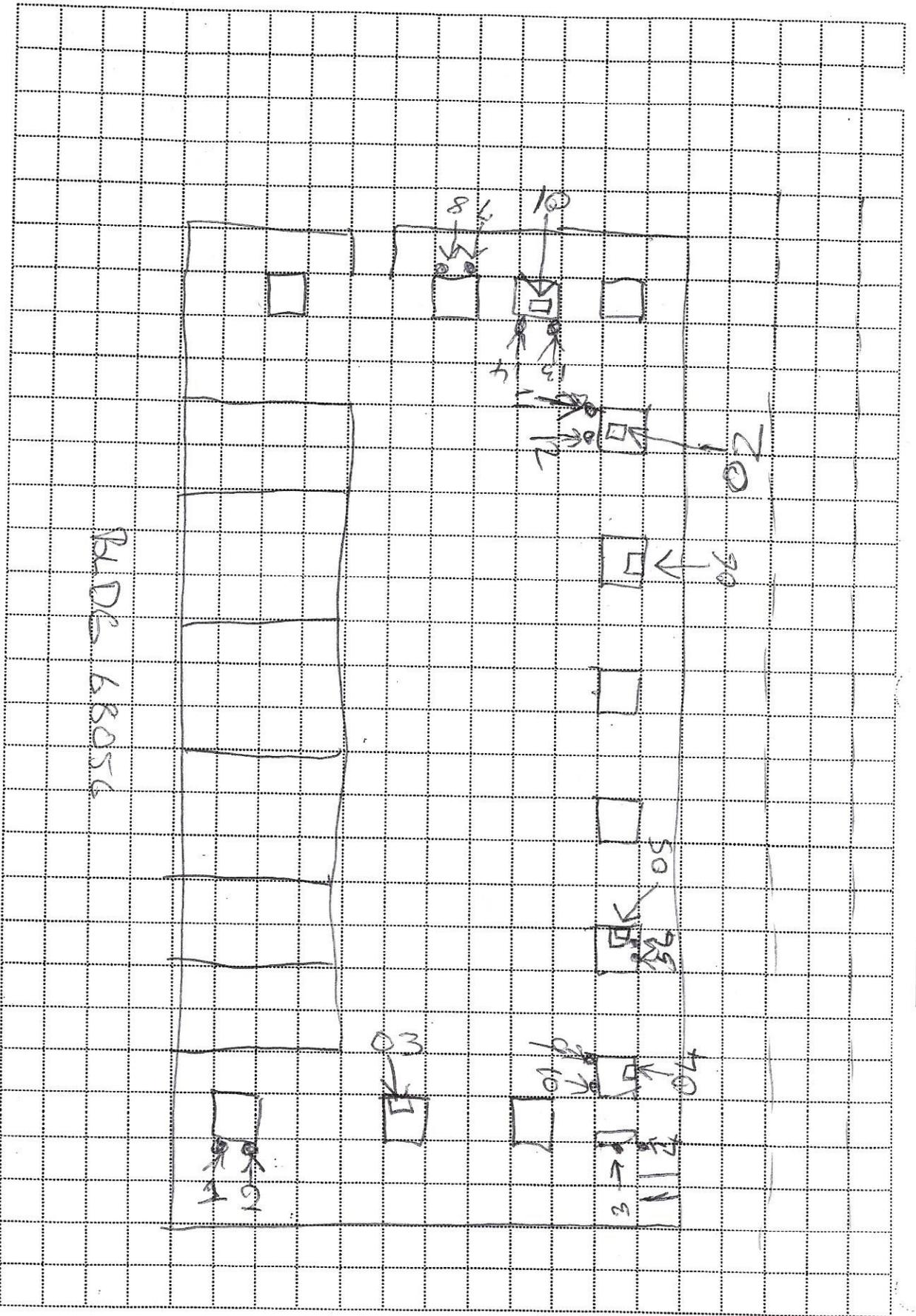
LEAD BASED PAINT SAMPLE PLAN (Lead swab tests)

Date: 2-26-14

Work Order #: 1-2676376 Building #: 68056

Work Description: A.B.P. CHECK

Sample #	Description	Location	Results
1	BROWN PAINT ON WOOD IN WINDOW	WEST SIDE OF BLDG	POS
2	BROWN PAINT ON WOODEN WINDOW SILL	" " " "	POS
3	CREAM PAINT ON WOODEN IN WINDOW	SOUTH " " "	POS
4	CREAM PAINT ON WOOD TRIM	" " " "	POS
5	BROWN PAINT ON WOOD IN WINDOW	" " " "	POS
6	BROWN PAINT ON WOODEN WINDOW SILL	" " " "	POS
7	BROWN PAINT ON WOOD TRIM WINDOW	WEST " " "	POS
8	BROWN PAINT ON WOODEN WINDOW SILL	" " " "	POS
9	WHITE PAINT ON INSIDE WOODEN WINDOW	SOUTH " " "	POS
10	WHITE PAINT ON INSIDE WOODEN TRIM	" " " "	NEG
11	WHITE PAINT ON INSIDE WOODEN WINDOW	" " " "	POS
12	WHITE PAINT ON INSIDE WINDOW TRIM	" " " "	POS



Address:

Building: 68056

Homogeneous Area ID: WINDOW

Functional space or room:

Scale:

Date:

2-20-14

Inspector:

TIE

Signature:



Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201300606

Client:

EMCOR GOVERNMENT SVCS

CLARKSTON RD BLDG 30033

FT HUACHUCA, AZ 85613-0000

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 1 PLM **Rec:** 1/17/2013 **Method:** EPA 600/R-93/116 The "New" Method; see below
Client Job: 1-1580911 **PO Number:** 68056
Report Date: 1/23/2013 **Date Analyzed:** 1/23/2013 **Routing Number:** -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFR Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantification of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the

estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary:

Job Number: 201300606 1-1580911

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	68056-01	2013-00606- 1	Roofing	Positive Layer? Yes
Layer # 1	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 2	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 3	black	roofing roll/shingle	<i>20-30% chrysotile asbestos</i>	
Layer # 4	black	roofing roll/shingle	<i>20-30% chrysotile asbestos</i>	
Layer # 5	black	roofing roll/shingle	<i>20-30% chrysotile asbestos</i>	
Layer # 6	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 7	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 8	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 9	black	roof ply	<i>30-40% chrysotile asbestos</i>	
Layer # 10	black	roof ply	<i>no asbestos detected</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

Sample 68056-01 Lab Number 2013-00606-1 Sampled: Condition: acceptable
 Analyzed By DMS 1/23/2013 An? OK Apparent Smp Type Roofing Fibrous Solid
 Homogeneous No # Layers 10 Pos Layer? Yes # Sub-Samples 30
 Non-Fibrous Components (in approx. decreasing order): bitumen, rock,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	roofing roll/shingle	11	black	1	30-40%	n.d.	-	-	-	-
2	roofing roll/shingle	11	black	1	30-40%	n.d.	-	-	-	-
3	roofing roll/shingle	11	black	1	2-5%	20-30%	-	-	-	-
4	roofing roll/shingle	11	black	1	2-5%	20-30%	-	-	-	-
5	roofing roll/shingle	11	black	1	2-5%	20-30%	-	-	-	-
6	roofing roll/shingle	11	black	1	30-40%	n.d.	-	-	-	-
7	roofing roll/shingle	11	black	1	30-40%	n.d.	-	-	-	-
8	roofing roll/shingle	11	black	1	30-40%	n.d.	-	-	-	-
9	roof ply	6	black	1	5-10%	30-40%	-	-	-	-
10	roof ply	6	black	1	60-70%	n.d.	-	-	-	-
Total %		100	Overall %		20-30%	10-20%	-	-	-	-
Fiber Identification:					cellulose fiber	chrysotile asbestos				

Fibers										Refractive Index Determinations				
	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per		
1	cellulose fiber	W	F	N	N	H	+	U						
2	chrysotile asbestos	W	A	N	N	L	+	P	1.550	vb/g	pb/r	1.556 1.549		
3														
4														
5														
6														

Sample Analytical Note
 Procedure: twease apart using forceps. Procedure: dissolution of matrix using solvent. Note: there appears to be more than one sample layer sequence in the bag (e.g., samples from more than one location); therefore, the reported layer sequence has been estimated/composited.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
 Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
 Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends;
 D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
 Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
 Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
 Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow; vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
 RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: DAVID M. SCHALLER

Printed: 23-Jan-13

Original Print Date: 23-Jan-13



Larry S. Pierce, Approved Accreditation Signatory



Fiberquant Analytical Services 5025 S. 33rd St.;
 Phoenix, AZ 85040; Phone: 602-276-6139; FAX: 602-276-4558;
 info@fiberquant.com

Analysis Request/Chain-of-Custody Form

Submitted by (Company) **EMCOR Government Services**
 Address **Clarkson RD Building 30033**
 City, State, Zip Code **Fort Huachuca, AZ 85613**
 Phone **520-533-5906** FAX **520-533-3699**
 Email **william.j.barnes88.ctr@mail.mil**

Invoice to (Company) **Department of Public Works**
 Address **3040 Butler Road Building 22422**
 City, State, Zip Code **Fort Huachuca, AZ 85613**
 Phone **520-533-2837** FAX **520-533-2227**

Contact (print) **Billy Barnes**
 Sampled by (signature) *[Signature]*
 Job Number or Project Name **1-1580911**
 PO Number **68056**

Analysis Method Requested ONLY ONE METHOD per COC		Turn-around-time (circle one)			
		Rush	Norm	Ext.	
Asbestos by PLM	Improved <input type="checkbox"/> Interim <input type="checkbox"/>	Urg. Rush < 4 hrs <input type="checkbox"/>	< 8 hrs <input type="checkbox"/>	1-3 days <input checked="" type="checkbox"/>	15-30 days <input type="checkbox"/>
	Analyze: <input checked="" type="checkbox"/> All or <input type="checkbox"/> ATPF				
	If ATPF then by: Layer <input type="checkbox"/> or Sample <input type="checkbox"/> Single Layer Protocol: Yes <input type="checkbox"/> No <input type="checkbox"/>				
Fibers by PCM	7400(Area) <input type="checkbox"/> ORM (Personal) <input type="checkbox"/>	< 4 hr <input type="checkbox"/>	24hr <input type="checkbox"/>	-	
Asbestos by TEM	AIR: AHERA <input type="checkbox"/> Mod. AHERA <input type="checkbox"/>	< 6hr <input type="checkbox"/>	24 hr <input type="checkbox"/>	3-5d <input type="checkbox"/>	
	Water*: Water <input type="checkbox"/> Sludge <input type="checkbox"/>	1-2d <input type="checkbox"/>	3-6d <input type="checkbox"/>	N/A	
	Annex2 : Chatfield <input type="checkbox"/> Full <input type="checkbox"/>				
	Vacuum Dust (ASTM)	3-5d <input type="checkbox"/>	5-10d <input type="checkbox"/>	N/A	
Pb by FLAA	Analyte: Pb Other <input type="checkbox"/>	< 6 hrs <input type="checkbox"/>	2-3 days <input type="checkbox"/>	N/A	
	Matrix: Filter: MCE <input type="checkbox"/>				
	Paint: by Area <input type="checkbox"/> by Weight <input type="checkbox"/>				
	Soil <input type="checkbox"/>				
	Wipe <input type="checkbox"/>				
Initial here certifying wipes used are ASTM E1782 compliant <input type="checkbox"/>					
Fungi	Air Sample: Zef <input type="checkbox"/> Alter <input type="checkbox"/> Oth <input type="checkbox"/>	< 6 hrs <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A	
	Bulk: Sample <input type="checkbox"/> Swab <input type="checkbox"/>				
	Tape: Qualitative (%) <input type="checkbox"/> or Quantitative (cm2) <input type="checkbox"/>				
Soot	ASTM D6802-03B	Optical <input type="checkbox"/>	< 6r <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A
		Optical & TEM <input type="checkbox"/>	1-2 days <input type="checkbox"/>	3-5days <input type="checkbox"/>	N/A
Other			Call	Call	

Sample Number	Description/Location (include room type, make, etc. Data)	Sample Date	Sample Time	Vol/Area
1) 68056-01	ROOF CORE/SE CORNER ROOF	15 JAN 13		
2)				
3)				
4)				
5)				
6)				
7)				
8)				
9)				
10)				
11)				
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: <i>[Signature]</i>	Date: 16 JAN 13	Time: 1000	3) Relinquished by:	Date:	Time:
2) Received by: <i>[Signature]</i>	Date: 1-17-13	Time: 10:25 AM	4) Received by:	Date:	Time:
* TEM Water Sampler's name Required by State of Arizona	Print Name	F/X			

Review of Analysis Request (Initials) ELC

Note: Data completed by client (including number and identity of samples) is assumed to be correct until it is verified at time of sample preparation.

201300606



Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201301115

Client:

EMCOR GOVERNMENT SVCS

CLARKSTON RD BLDG 30033

FT HUACHUCA, AZ 85613-0000

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 1 PLM **Rec:** 1/31/2013 **Method:** EPA 600/R-93/116 The "New" Method; see below
Client Job: 1-1610512 **PO Number:** 68056
Report Date: 2/5/2013 **Date Analyzed:** 2/5/2013 **Routing Number:** -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFR Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantification of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that

analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary:

Job Number: 201301115 1-1610512

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	68056-01	2013-01115- 1	Wall System	Positive Layer? No
Layer # 1	black	paint	<i>no asbestos detected</i>	
Layer # 2	tan	paper/cardboard	<i>no asbestos detected</i>	
Layer # 3	white	drywall core	<i>no asbestos detected</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

Sample 68056-01 Lab Number 2013-01115- 1 Sampled: Condition: acceptable
 Analyzed By MAC 2/5/2013 An? OK Apparent Smp Type Wall System Fibrous Solid
 Homogeneous No # Layers 3 Pos Layer? No # Sub-Samples 8
 Non-Fibrous Components (in approx. decreasing order): powder, polymer,

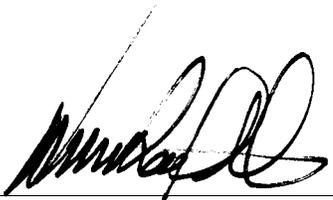
Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	2	black	1	n.d.	-	-	-	-	-
2	paper/cardboard	4	tan	2	90-100%	-	-	-	-	-
3	drywall core	94	white	3	<=1%	-	-	-	-	-
Total %		100	Overall %		2-5%	-	-	-	-	-

Fiber Identification: cellulose fiber

Fibers									Refractive Index Determinations				
	Color	Mrph	Iso	Pleo	Bi	Elg	Ext		Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweasted apart using forceps. Procedure: dissolution of matrix using solvent. Note: no texture layer observed.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
 Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
 Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends;
 D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
 Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
 Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
 Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow;
 vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
 RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: MICHAEL A. COOK

Printed: 05-Feb-13

Original Print Date: 05-Feb-13



Larry S. Pierce, Approved Accreditation Signatory

FIBERQUANT

ANALYTICAL SERVICES

Fiberquant Analytical Services 5025 S. 33rd St.;
Phoenix, AZ 85040; Phone: 602-276-6139; FAX: 602-276-4558;
info@fiberquant.com

Analysis Request/Chain-of-Custody Form

Submitted by (Company) EMCOR Government Services	
Address Clarkson RD Building 30033	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-5906	FAX 520-533-3699
Email william.j.barnes88.ctr@mail.mil	
Invoice to (Company) Department of Public Works	
Address 3040 Butler Road Building 22422	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-2837	FAX 520-533-2227
Contact (print) Billy Barnes	
Sampled by (signature) <i>B. Barnes</i>	
Job Number or Project Name 1-1610512	
PO Number 68056	

Analysis Method Requested ONLY ONE METHOD per COC		Turn-around-time (circle one)			
		Rush	Norm	Ext.	
Asbestos by PLM	Improved <input type="checkbox"/> Interim <input type="checkbox"/>	Urg. Rush < 3 hrs <input type="checkbox"/>	< 6 hrs <input type="checkbox"/>	1-3 days <input checked="" type="checkbox"/>	15-30 days <input type="checkbox"/>
	Analyze: <input checked="" type="checkbox"/> AIB or <input type="checkbox"/> ATPF If ATPF then by: Layer <input type="checkbox"/> or Sample <input type="checkbox"/> Single Layer Protocol: Yes <input type="checkbox"/> No <input type="checkbox"/>				
Fibers by PCM	7400(Area) <input type="checkbox"/> ORM (Personal) <input type="checkbox"/>	< 4 hr <input type="checkbox"/>	24hr <input type="checkbox"/>	-	
Asbestos by TEM	AIR: AHERA <input type="checkbox"/> Mod. AHERA <input type="checkbox"/>	< 6hr <input type="checkbox"/>	24 hr <input type="checkbox"/>	3-5d <input type="checkbox"/>	
	Water*: Water <input type="checkbox"/> Sludge <input type="checkbox"/>	1-2d <input type="checkbox"/>	3-5d <input type="checkbox"/>	N/A	
	Annex2: Chatfield <input type="checkbox"/> Full <input type="checkbox"/>				
	Vacuum Dust (ASTM)	3-5d <input type="checkbox"/>	5-10d <input type="checkbox"/>	N/A	
Pb by FLAA	Analyte: Pb Other	< 6 hrs <input type="checkbox"/>	2-3 days <input type="checkbox"/>	N/A	
	Filter: MCE <input type="checkbox"/>				
	Paint: by Area <input type="checkbox"/> by Weight <input type="checkbox"/>				
	Soil <input type="checkbox"/>				
	Wipe <input type="checkbox"/>				
Initial here certifying wipes used are ASTM E1792 compliant <input type="checkbox"/>					
Fungi	Air Sample: Zef <input type="checkbox"/> Aller <input type="checkbox"/> Oth <input type="checkbox"/>	< 6 hrs <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A	
	Bulk: Sample <input type="checkbox"/> Swab <input type="checkbox"/>				
	Tape: Qualitative (%) <input type="checkbox"/> or Quantitative (cm2) <input type="checkbox"/>				
Soot	ASTM D6602-03B	< 6r <input type="checkbox"/>	1-2 days <input type="checkbox"/>	1-2 days <input type="checkbox"/> N/A	
				Optical & TEM	3-5days <input type="checkbox"/>
Other		Call	Call		

Sample Number	Description/Location (Include exact type/maker/loc. Date)	Sample Date	Sample Time	Vol/Area
1) 68056-01	DRYWALL/BAY AREA WALL	29 JAN 13		
2)				
3)				
4)				
5)				
6)				
7)				
8)				
9)	Bill THIS JOB FOR			
10)	DELIVERY			
11)				
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: <i>B. Barnes</i> Date: 30 JAN 13 Time: 09:30	3) Relinquished by:	Date:	Time:
2) Received by: <i>Kelly Barnes</i> Date: 1-31-13 Time: 10:35	4) Received by:	Date:	Time:
* TEM Water Sampler's name Required by State of Arizona	Print Name FIX	Page 1 of 1	

Review of Analysis Request (Initials) KKK

Note: Data completed by client (including number and identity of samples) is assumed to be correct until it is verified at time of sample preparation.

20130115



Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201401995

Client:

EMCOR GOVERNMENT SVCS

CLARKSTON RD BLDG 30033

FT HUACHUCA, AZ 85613-0000

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 6 PLM **Rec:** 2/28/2014 **Method:** EPA 600/R-93/116

The "New" Method; see below

Client Job: 1-2676376

PO Number: 68056

Report Date: 3/4/2014

Date Analyzed: 3/4/2014

Routing Number: -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFR Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantification of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the

estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

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Job Analysis Notes:

PLM Analysis Summary:

Job Number: 201401995 1-2676376

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	68056-01	2014-01995- 1	Adhesive/caulk	Positive Layer? No
Layer # 1	off-white		<i>no asbestos detected</i>	
Layer # 2	off-white		<i>no asbestos detected</i>	
Sample #	68056-02	2014-01995- 2	Adhesive/caulk	Positive Layer? No
Layer # 1	off-white		<i>no asbestos detected</i>	
Sample #	68056-03	2014-01995- 3	Adhesive/caulk	Positive Layer? Yes
Layer # 1	gray		<i>no asbestos detected</i>	
Layer # 2	off-white		<i>>1-2% chrysotile asbestos</i>	
Sample #	68056-04	2014-01995- 4	Adhesive/caulk	Positive Layer? No
Layer # 1	off-white		<i>no asbestos detected</i>	
Sample #	68056-05	2014-01995- 5	Adhesive/caulk	Positive Layer? No
Layer # 1	white		<i>no asbestos detected</i>	
Sample #	68056-06	2014-01995- 6	Adhesive/caulk	Positive Layer? Yes
Layer # 1	gray		<i>no asbestos detected</i>	
Layer # 2	off-white		<i>>1-2% chrysotile asbestos</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

PLM Analysis Details

Job Number: 201401995 1-2676376

Sample 68056-01 **Lab Number** 2014-01995- 1 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk **Rubbery**
Homogeneous No **# Layers** 2 **Pos Layer?** No **# Sub-Samples** 5
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	off-white	1	n.d.	-	-	-	-	-
2	caulk	95	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification: none										

Fibers										Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per		
1	none													
2														
3														
4														
5														
6														

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of polymer matrix using solvent.

Sample 68056-02 **Lab Number** 2014-01995- 2 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk **Rubbery**
Homogeneous Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	caulk	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification: none										

Fibers										Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per		
1	none													
2														
3														
4														
5														
6														

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

Sample 68056-03 **Lab Number** 2014-01995- 3 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk **Non-fibrous Solid**
Homogeneous No **# Layers** 2 **Pos Layer?** Yes **# Sub-Samples** 5
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	gray	1	n.d.	-	-	-	-	-
2	putty	95	off-white	1	>1-2%	-	-	-	-	-
Total %		100	Overall %		>1-2%	-	-	-	-	-
Fiber Identification: chrysotile asbestos										

Fibers										Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per		
1	chrysotile asbestos	W	A	N	N	L	+	P	1.550	db/ly	sb/o	1.561 1.553		
2														
3														
4														
5														
6														

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of polymer matrix using solvent.

PLM Analysis Details

Job Number: 201401995 1-2676376

Sample 68056-04 **Lab Number** 2014-01995- 4 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk Rubbery
Homogeneous Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	caulk	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification: none										

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

Sample 68056-05 **Lab Number** 2014-01995- 5 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk Rubbery
Homogeneous Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	caulk	100	white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification: none										

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

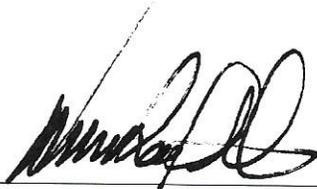
Sample 68056-06 **Lab Number** 2014-01995- 6 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk Non-fibrous Solid
Homogeneous No **# Layers** 2 **Pos Layer?** Yes **# Sub-Samples** 5
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	gray	1	n.d.	-	-	-	-	-
2	putty	95	off-white	1	>1-2%	-	-	-	-	-
Total %		100	Overall %		>1-2%	-	-	-	-	-
Fiber Identification: chrysotile asbestos										

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	chrysotile asbestos	W	A	N	N	L	+	P	1.550	db/ly	sb/o	1.561, 1.553	
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of polymer matrix using solvent.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends; D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow; vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: MICHAEL A. COOK

Printed: 04-Mar-14

Original Print Date: 04-Mar-14



Larry S. Pierce, Approved Accreditation Signatory



Fiberquant Analytical Services 5025 S. 33rd St.;
 Phoenix, AZ 85040; Phone: 602-276-6139; FAX: 602-276-4558;
 info@fiberquant.com

Analysis Request/Chain-of-Custody Form

Submitted by (Company) **EMCOR Government Services**
 Address **Clarkson RD Building 30033**
 City, State, Zip Code **Fort Huachuca, AZ 85613**
 Phone **520-533-5906** FAX **520-533-3699**
 Email **william.j.barnes88.ctr@mail.mil**

Invoice to (Company) **Department of Public Works**
 Address **3040 Butler Road Building 22422**
 City, State, Zip Code **Fort Huachuca, AZ 85613**
 Phone **520-533-2837** FAX **520-533-2227**

Contact (print) **Billy Barnes**
 Sampled by (signature) *[Signature]*
 Job Number or Project Name **1-2676376**
 PO Number **68056**

Analysis Method Requested ONLY ONE METHOD per COC		Turn-around-time (circle one)			
		Rush	Norm	Ext.	
Asbestos by PLM	Improved <input type="checkbox"/> / Interim <input type="checkbox"/>	Urg. <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-3 days <input checked="" type="checkbox"/>	15-30 days <input type="checkbox"/>
	Analyze: <input checked="" type="checkbox"/> All or <input type="checkbox"/> ATPF If ATPF then by: Layer <input type="checkbox"/> or Sample <input type="checkbox"/> Single Layer Protocol: Yes <input type="checkbox"/> No <input type="checkbox"/>	<3 hrs <input type="checkbox"/>			
Fibers by PCM	7400(Area) <input type="checkbox"/> ORM (Personal) <input type="checkbox"/>	<4 hr <input type="checkbox"/>	24hr <input type="checkbox"/>		
Asbestos by TEM	AIR: AHERA <input type="checkbox"/> Mod. AHERA <input type="checkbox"/>	<6hr <input type="checkbox"/>	24 hr <input type="checkbox"/>	3-5d <input type="checkbox"/>	
	Water*: Water <input type="checkbox"/> Sludge <input type="checkbox"/>	1-2d <input type="checkbox"/>	3-5d <input type="checkbox"/>	N/A	
	Annex2 : Chatfield <input type="checkbox"/> Full <input type="checkbox"/>				
	Vacuum Dust (ASTM)	3-5d <input type="checkbox"/>	5-10d <input type="checkbox"/>	N/A	
Pb by FLAA	Analyte: Pb Other	<6 hrs <input type="checkbox"/>	2-3 days <input type="checkbox"/>	N/A	
	Filter: MCE <input type="checkbox"/>				
	Matrix: Paint: by Area <input type="checkbox"/> by Weight <input type="checkbox"/>				
	Soil <input type="checkbox"/> Wipe <input type="checkbox"/>				
	Initial here certifying wipes used are ASTM E1792 compliant <input type="checkbox"/>				
Fungi	Air Sample: Zef <input type="checkbox"/> Aller <input type="checkbox"/> Oth <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A	
	Bulk: Sample <input type="checkbox"/> Swab <input type="checkbox"/>				
	Tape: Qualitative (%) <input type="checkbox"/> or Quantitative (cm2) <input type="checkbox"/>				
Soot	ASTM D6602-03B	Optical <input type="checkbox"/>	<6r <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A
		Optical & TEM <input type="checkbox"/>	1-2 days <input type="checkbox"/>	3-5days <input type="checkbox"/>	N/A
Other		Call	Call		

Sample Number	Description/Location (include area type/maker/exp. Date)	Sample Date	Sample Time	Vol/Area
1) 68056-01	CAULK EAST SIDE OF BLDG	2-26-14		
2) 02	CAULK SOUTH SIDE OF BLDG	2-26-14		
3) 03	PTTY WEST SIDE OF BLDG	2-26-14		
4) 04	CAULK SOUTH SIDE OF BLDG	2-26-14		
5) 05	CAULK SOUTH SIDE OF BLDG	2-26-14		
6) 06	PTTY SOUTH SIDE OF BLDG	2-26-14		
7)				
8)				
9)				
10)				
11)				
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

BILL FOR DELIVERY

1) Relinquished by: <i>[Signature]</i>	Date: 2/27/14	Time: 7:30 AM	3) Relinquished by:	Date:	Time:
2) Received by: <i>[Signature]</i>	Date: 2/28/14	Time: 10:30	4) Received by:	Date:	Time:
* TEM Water: Sampler's name Required by State of Arizona			Print Name	FX	

Review of Analysis Request (Initials) *[Signature]*

Note: Data completed by client (including number and identity of samples) is assumed to be correct until it is verified at time of sample preparation.



Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201300604

Client:

EMCOR GOVERNMENT SVCS

CLARKSTON RD BLDG 30033

FT HUACHUCA, AZ 85613-0000

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 1 PLM **Rec:** 1/17/2013 **Method:** EPA 600/R-93/116 The "New" Method; see below
Client Job: 1-1580912 **PO Number:** 68057
Report Date: 1/23/2013 **Date Analyzed:** 1/23/2013 **Routing Number:** -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFR Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantification of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the

estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary:

Job Number: 201300604 1-1580912

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	68057-01	2013-00604- 1	Roofing	Positive Layer? Yes
Layer # 1	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 2	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 3	black	roofing roll/shingle	<i>20-30% chrysotile asbestos</i>	
Layer # 4	black	roofing roll/shingle	<i>20-30% chrysotile asbestos</i>	
Layer # 5	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 6	black	roof ply	<i>no asbestos detected</i>	
Layer # 7	black	roof ply	<i>no asbestos detected</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

Sample 68057-01 Lab Number 2013-00604- 1 Sampled: Condition: acceptable
 Analyzed By DMS 1/23/2013 An? OK Apparent Smp Type Roofing Fibrous Solid
 Homogeneous No # Layers 7 Pos Layer? Yes # Sub-Samples 21
 Non-Fibrous Components (in approx. decreasing order): bitumen, rock,

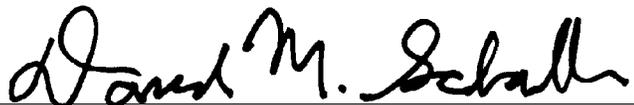
Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	roofing roll/shingle	17	black	1	30-40%	2-5%	n.d.	-	-	-
2	roofing roll/shingle	17	black	1	30-40%	n.d.	n.d.	-	-	-
3	roofing roll/shingle	17	black	1	5-10%	n.d.	20-30%	-	-	-
4	roofing roll/shingle	17	black	1	5-10%	n.d.	20-30%	-	-	-
5	roofing roll/shingle	17	black	1	10-20%	n.d.	n.d.	-	-	-
6	roof ply	8	black	1	40-50%	n.d.	n.d.	-	-	-
7	roof ply	7	black	1	60-70%	n.d.	n.d.	-	-	-
Total %		100	Overall %		20-30%	<=1%	10-20%	-	-	-

Fiber Identification: cellulose fiber synthetic fiber (extr) chrysotile asbestos

Fibers	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Refractive Index Determinations					
								Oil	Col Par	Col Per	RI Par	RI Per	
1	cellulose fiber	W	F	N	N	H	+	U					
2	synthetic fiber (extruded)	W	E	N	N	H	+	P					
3	chrysotile asbestos	W	A	N	N	L	+	P	1.550	vb/g	pb/r	1.556	1.549
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent. Note: there appears to be more than one sample layer sequence in the bag (e.g., samples from more than one location); therefore, the reported layer sequence has been estimated/composited.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
 Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
 Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends;
 D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
 Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
 Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
 Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow;
 vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
 RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: DAVID M. SCHALLER

Printed: 23-Jan-13

Original Print Date: 23-Jan-13



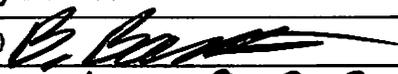
Larry S. Pierce, Approved Accreditation Signatory

FIBERQUANT

ANALYTICAL SERVICES

Fiberquant Analytical Services 5025 S. 33rd St.;
Phoenix, AZ 85040; Phone: 602-276-6139; FAX: 602-276-4558;
info@fiberquant.com

Analysis Request/Chain-of-Custody Form

Submitted by (Company) EMCOR Government Services	
Address Clarkson RD Building 30033	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-5906	FAX 520-533-3699
Email william.j.barnes88.ctr@mail.mil	
Invoice to (Company) Department of Public Works	
Address 3040 Butler Road Building 22422	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-2837	FAX 520-533-2227
Contact (print) Billy Barnes	
Sampled by (signature) 	
Job Number or Project Name 1-1580912	
PO Number 68057	

Analysis Method Requested ONLY ONE METHOD per COC		Turn-around-time (circle one)			
		Rush	Norm	Ext.	
Asbestos by PLM	Improved <input type="checkbox"/> Interim <input type="checkbox"/>	Urg. Rush <3 hrs <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-3 days <input checked="" type="checkbox"/>	15-30 days <input type="checkbox"/>
	Analyze: PLM or <input type="checkbox"/> ATPF				
	If ATPF then by: Layer <input type="checkbox"/> or Sample <input type="checkbox"/>				
	Single Layer Protocol: Yes <input type="checkbox"/> No <input type="checkbox"/>				
Fibers by PCM	7400(Area) <input type="checkbox"/> ORM (Personal) <input type="checkbox"/>	<4 hr <input type="checkbox"/>	24hr <input type="checkbox"/>	-	
Asbestos by TEM	AIR: AHERA <input type="checkbox"/> Mod. AHERA <input type="checkbox"/>	<6hr <input type="checkbox"/>	24 hr <input type="checkbox"/>	3-5d <input type="checkbox"/>	
	Water*: Water <input type="checkbox"/> Sludge <input type="checkbox"/>	1-2d <input type="checkbox"/>	3-5d <input type="checkbox"/>	N/A	
	Annex2 : Chatfield <input type="checkbox"/> Full <input type="checkbox"/>				
	Vacuum Dust (ASTM)	3-5d <input type="checkbox"/>	5-10d <input type="checkbox"/>	N/A	
Pb by FLAA	Analyte: Pb Other	<6 hrs <input type="checkbox"/>	2-3 days <input type="checkbox"/>	N/A	
	Filter: MCE <input type="checkbox"/>				
	Paint: by Area <input type="checkbox"/> by Weight <input type="checkbox"/>				
	Soil <input type="checkbox"/>				
	Wipe <input type="checkbox"/>				
Initial here certifying wipes used are ASTM E1792 compliant <input type="checkbox"/>					
Fungi	Air Sample: Zef <input type="checkbox"/> Aller <input type="checkbox"/> Oth <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A	
	Bulk: Sample <input type="checkbox"/> Swab <input type="checkbox"/>				
	Tape: Qualitative (%) <input type="checkbox"/> or Quantitative (cm2) <input type="checkbox"/>				
Soot	ASTM D6602-03B	<6r <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A	
					Optical & TEM
Other		Call	Call		

Sample Number	Description/Location (include exact type/material/etc. Data)	Sample Date	Sample Time	Vol/Area
1) 68057-01	ROOF CORE/SE CORNER ROOF	15 JAN 13		
2)				
3)				
4)				
5)				
6)				
7)				
8)				
9)				
10)				
11)				
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: 	Date: 16 JAN 13	Time: 1000	3) Relinquished by:	Date:	Time:
2) Received by: 	Date: 1-17-13	Time: 10:35AM	4) Received by:	Date:	Time:
* TEM Water Sampler name Required by State of Arizona		Print Name	FIX		

Review of Analysis Request (Initials) gjc

Note: Data completed by client (including number and identity of samples) is assumed to be correct until it is verified at time of sample preparation.

201300604



Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201301117

Client:

EMCOR GOVERNMENT SVCS

CLARKSTON RD BLDG 30033

FT HUACHUCA, AZ 85613-0000

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 4 PLM **Rec:** 1/31/2013 **Method:** EPA 600/R-93/116 The "New" Method; see below
Client Job: 1-1610514 **PO Number:** 68057
Report Date: 2/5/2013 **Date Analyzed:** 2/5/2013 **Routing Number:** -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFR Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantification of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that

analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary:

Job Number: 201301117 1-1610514

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	<u>68057-01</u>	2013-01117- 1	Wall System	Positive Layer? No
Layer # 1	various	paint	<i>no asbestos detected</i>	
Layer # 2	tan	paper/cardboard	<i>no asbestos detected</i>	
Layer # 3	white	drywall core	<i>no asbestos detected</i>	
Sample #	<u>68057-02</u>	2013-01117- 2	TSI	Positive Layer? No
Layer # 1	silver	insulation wrap	<i>no asbestos detected</i>	
Sample #	<u>68057-03</u>	2013-01117- 3	Wall System	Positive Layer? No
Layer # 1	various	paint	<i>no asbestos detected</i>	
Layer # 2	tan	paper/cardboard	<i>no asbestos detected</i>	
Layer # 3	white	drywall core	<i>no asbestos detected</i>	
Sample #	<u>68057-04</u>	2013-01117- 4	Adhesive/caulk	Positive Layer? No
Layer # 1	off-white	putty	<i>no asbestos detected</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

PLM Analysis Details

Job Number: 201301117 1-1610514

Sample 68057-01 **Lab Number** 2013-01117- 1 **Sampled:** **Condition:** acceptable
Analyzed By RAM 2/5/2013 **An?** OK **Apparent Smp Type** Wall System **Fibrous Solid**
Homogeneous No **# Layers** 3 **Pos Layer?** No **# Sub-Samples** 6
Non-Fibrous Components (in approx. decreasing order): powder, binder,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	various	1	n.d.	-	-	-	-	-
2	paper/cardboard	5	tan	2	90-100%	-	-	-	-	-
3	drywall core	90	white	3	>1-2%	-	-	-	-	-
Total %		100	Overall %		5-10%	-	-	-	-	-
Fiber Identification:					cellulose fiber					

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent. No texture.

Sample 68057-02 **Lab Number** 2013-01117- 2 **Sampled:** **Condition:** acceptable
Analyzed By RAM 2/5/2013 **An?** OK **Apparent Smp Type** TSI **Fibrous Mat**
Homogeneous Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): binder, metal,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	insulation wrap	100	silver	2	40-50%	10-20%	-	-	-	-
Total %		100	Overall %		40-50%	10-20%	-	-	-	-
Fiber Identification:					cellulose	glass fiber				

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	cellulose	W	F	N	N	H	+	U					
2	glass fiber	CL	D	Y									
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

Sample 68057-03 Lab Number 2013-01117- 3 Sampled: Condition: acceptable
 Analyzed By RAM 2/5/2013 An? OK Apparent Smp Type Wall System Fibrous Solid
 Homogeneous No # Layers 3 Pos Layer? No # Sub-Samples 6
 Non-Fibrous Components (in approx. decreasing order): powder, binder,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	3	various	1	n.d.	-	-	-	-	-
2	paper/cardboard	7	tan	2	90-100%	-	-	-	-	-
3	drywall core	90	white	3	>1-2%	-	-	-	-	-
Total %		100	Overall %		5-10%	-	-	-	-	-
Fiber Identification:					cellulose fiber					

Fibers								Refractive Index Determinations				
	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per
1	cellulose fiber	W	F	N	N	H	+	U				
2												
3												
4												
5												
6												

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent. No texture.

Sample 68057-04 Lab Number 2013-01117- 4 Sampled: Condition: acceptable
 Analyzed By RAM 2/5/2013 An? OK Apparent Smp Type Adhesive/caulk Non-fibrous Solid
 Homogeneous Yes # Layers 1 Pos Layer? No # Sub-Samples 3
 Non-Fibrous Components (in approx. decreasing order): filler, binder,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	putty	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers								Refractive Index Determinations				
	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per
1	none											
2												
3												
4												
5												
6												

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
 Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
 Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends;
 D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
 Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
 Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
 Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow;
 vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
 RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: ROBERT A. McCORMICK

Printed: 05-Feb-13

Original Print Date: 05-Feb-13



Larry S. Pierce, Approved Accreditation Signatory

FIBERQUANT

ANALYTICAL SERVICES

Fiberquant Analytical Services 5025 S. 33rd St.;
Phoenix, AZ 85040; Phone: 602-276-6139; FAX: 602-276-4558;
info@fiberquant.com

Analysis Request/Chain-of-Custody Form

Submitted by (Company) EMCOR Government Services	
Address Clarkson RD Building 30033	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-5906	FAX 520-533-3699
Email william.j.barnes88.ctr@mail.mil	
Invoice to (Company) Department of Public Works	
Address 3040 Butler Road Building 22422	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-2837	FAX 520-533-2227
Contact (print) Billy Barnes	
Sampled by (signature) <i>B. Barnes</i>	
Job Number or Project Name 1-1610514	
PO Number 68057	

Analysis Method Requested ONLY ONE METHOD per COC		Turn-around-time (circle one)			
		Rush	Norm	Ext.	
Asbestos by PLM	Improved <input type="checkbox"/> Interim <input type="checkbox"/>	Urg. Rush <3 hrs <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-3 days <input checked="" type="checkbox"/>	15-30 days <input type="checkbox"/>
	Analyze: <input checked="" type="checkbox"/> All or <input type="checkbox"/> ATPF If ATPF then by: Layer <input type="checkbox"/> or Sample <input type="checkbox"/> Single Layer Protocol: Yes <input type="checkbox"/> No <input type="checkbox"/>				
Fibers by PCM	7400(Area) <input type="checkbox"/> ORM (Personal) <input type="checkbox"/>	<4 hr <input type="checkbox"/>	24hr <input type="checkbox"/>	-	
Asbestos by TEM	AIR: AHERA <input type="checkbox"/> Mod. AHERA <input type="checkbox"/>	<6hr <input type="checkbox"/>	24 hr <input type="checkbox"/>	3-5d <input type="checkbox"/>	
	Water*: Water <input type="checkbox"/> Sludge <input type="checkbox"/>	1-2d <input type="checkbox"/>	3-5d <input type="checkbox"/>	N/A	
	Annex2: Chatfield <input type="checkbox"/> Full <input type="checkbox"/>				
	Vacuum Dust (ASTM)	3-5d <input type="checkbox"/>	5-10d <input type="checkbox"/>	N/A	
Pb by FLAA	Analys: Pb Other	<6 hrs <input type="checkbox"/>	2-3 days <input type="checkbox"/>	N/A	
	Filter: MCE <input type="checkbox"/>				
	Matrix: Paint: by Area <input type="checkbox"/> by Weight <input type="checkbox"/>				
	Soil <input type="checkbox"/> Wipe <input type="checkbox"/>				
	Initial here certifying wipes used are ASTM E1792 compliant <input type="checkbox"/>				
Fungi	Air Sample: Zef <input type="checkbox"/> Aller <input type="checkbox"/> Oth <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A	
	Bulk: Sample <input type="checkbox"/> Swab <input type="checkbox"/>				
	Tape: Qualitative (%) <input type="checkbox"/> or Quantitative (cm2) <input type="checkbox"/>				
Soot	ASTM D6602-03B	Optical <input type="checkbox"/>	<6r <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A
		Optical & TEM <input type="checkbox"/>	1-2 days <input type="checkbox"/>	3-5days <input type="checkbox"/>	N/A
Other		Call	Call		

Sample Number	Description/Location (include room type and location, Date)	Sample Date	Sample Time	Vol/Area
1) 68057-01	DRYWALL/BAY AREA WALL	29 JAN 13		
2) -02	TSL/PIPE RISER NORTH WALL			
3) -03	DRYWALL/BAY AREA WALL			
4) -04	GLAZING/WINDOW FRAME			
5)				
6)				
7)				
8)				
9)				
10)				
11)				
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: <i>[Signature]</i>	Date: 30 JAN 13 Time: 0930	3) Relinquished by:	Date:	Time:	
2) Received by: <i>[Signature]</i>	Date: 31 13 Time: 10:34	4) Received by:	Date:	Time:	
* TEM Water: Sampler's name Required by State of Arizona		Print Name: FX	Page 1 of 1		

Review of Analysis Request (Initials) KLK

Note: Data completed by client (including number and identity of samples) is assumed to be correct until it is verified at time of sample preparation.

20130117



Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201401996

Client:

EMCOR GOVERNMENT SVCS

CLARKSTON RD BLDG 30033

FT HUACHUCA, AZ 85613-0000

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 6 PLM **Rec:** 2/28/2014 **Method:** EPA 600/R-93/116 The "New" Method; see below
Client Job: 1-2676377 **PO Number:** 68057
Report Date: 3/4/2014 **Date Analyzed:** 3/4/2014 **Routing Number:** -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

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Job Analysis Notes:

PLM Analysis Summary:

Job Number: 201401996 1-2676377

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	68057-01	2014-01996- 1	Adhesive/caulk	Positive Layer? No
Layer # 1	tan		<i>no asbestos detected</i>	
Layer # 2	gray		<i>no asbestos detected</i>	
Sample #	68057-02	2014-01996- 2	Adhesive/caulk	Positive Layer? Yes
Layer # 1	tan		<i>no asbestos detected</i>	
Layer # 2	off-white		<i>>1-2% chrysotile asbestos</i>	
Sample #	68057-03	2014-01996- 3	Adhesive/caulk	Positive Layer? No
Layer # 1	tan		<i>no asbestos detected</i>	
Layer # 2	gray		<i>no asbestos detected</i>	
Sample #	68057-04	2014-01996- 4	Adhesive/caulk	Positive Layer? No
Layer # 1	tan		<i>no asbestos detected</i>	
Sample #	68057-05	2014-01996- 5	Adhesive/caulk	Positive Layer? No
Layer # 1	off-white		<i>no asbestos detected</i>	
Sample #	68057-06	2014-01996- 6	Adhesive/caulk	Positive Layer? No
Layer # 1	off-white		<i>no asbestos detected</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

PLM Analysis Details

Job Number: 201401996 1-2676377

Sample 68057-01 **Lab Number** 2014-01996- 1 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk Non-fibrous Solid
Homogeneous No **# Layers** 2 **Pos Layer?** No **# Sub-Samples** 5
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	tan	1	n.d.	-	-	-	-	-
2	putty	95	gray	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of polymer matrix using solvent.

Sample 68057-02 **Lab Number** 2014-01996- 2 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk Non-fibrous Solid
Homogeneous No **# Layers** 2 **Pos Layer?** Yes **# Sub-Samples** 5
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	tan	1	n.d.	-	-	-	-	-
2	putty	95	off-white	1	>1-2%	-	-	-	-	-
Total %		100	Overall %		>1-2%	-	-	-	-	-
Fiber Identification:					chrysotile asbestos					

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	chrysotile asbestos	W	A	N	N	L	+	P	1.550	db/ly	sb/o	1.561 1.553	
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of polymer matrix using solvent.

Sample 68057-03 **Lab Number** 2014-01996- 3 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk Non-fibrous Solid
Homogeneous No **# Layers** 2 **Pos Layer?** No **# Sub-Samples** 5
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	5	tan	1	n.d.	-	-	-	-	-
2	putty	95	gray	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of polymer matrix using solvent.

PLM Analysis Details

Job Number: 201401996 1-2676377

Sample 68057-04 **Lab Number** 2014-01996- 4 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk **Condition:** Rubbery
Homogeneous Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	caulk	100	tan	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification: none										

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

Sample 68057-05 **Lab Number** 2014-01996- 5 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk **Condition:** Non-fibrous Solid
Homogeneous Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	putty	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification: none										

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

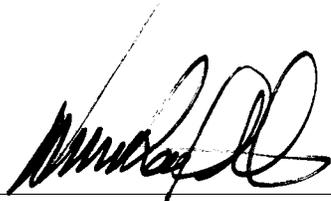
Sample 68057-06 **Lab Number** 2014-01996- 6 **Sampled:** **Condition:** acceptable
Analyzed By MAC 3/4/2014 **An?** OK **Apparent Smp Type** Adhesive/caulk **Condition:** Non-fibrous Solid
Homogeneous Yes **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): polymer, filler,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	putty	100	off-white	1	n.d.	-	-	-	-	-
Total %		100	Overall %		n.d.	-	-	-	-	-
Fiber Identification: none										

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of matrix using solvent.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends;
D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow; vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: MICHAEL A. COOK

Printed: 04-Mar-14

Original Print Date: 04-Mar-14



Larry S. Pierce, Approved Accreditation Signatory

FIBERQUANT

ANALYTICAL SERVICES

Fiberquant Analytical Services 5025 S. 33rd St.,
Phoenix, AZ 85040; Phone: 602-276-6139; FAX: 602-276-4558;
info@fiberquant.com

Analysis Request/Chain-of-Custody Form

Submitted by (Company) EMCOR Government Services	
Address Clarkson RD Building 30033	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-5906	FAX 520-533-3699
Email william.j.barnes88.ctr@mail.mil	
Invoice to (Company) Department of Public Works	
Address 3040 Butler Road Building 22422	
City, State, Zip Code Fort Huachuca, AZ 85613	
Phone 520-533-2837	FAX 520-533-2227
Contact (print) Billy Barnes	
Sampled by (signature) 	
Job Number or Project Name 1-2676377	
PO Number 68057	

Analysis Method Requested ONLY ONE METHOD per COC		Turn-around-time (circle one)			
		Rush		Norm	Ext.
Asbestos by PLM	Improved <input type="checkbox"/> Interim <input type="checkbox"/>	Urg. Rush <3 hrs <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-3 days <input checked="" type="checkbox"/>	15-30 days <input type="checkbox"/>
	Analyze: <input checked="" type="checkbox"/> All or <input type="checkbox"/> ATPF				
	If ATPF then by: Layer <input type="checkbox"/> or Sample <input type="checkbox"/> Single Layer Protocol: Yes <input type="checkbox"/> No <input type="checkbox"/>				
Fibers by PCM	7400(Area) <input type="checkbox"/> ORM (Personal) <input type="checkbox"/>	<4 hr <input type="checkbox"/>	24hr <input type="checkbox"/>	-	
Asbestos by TEM	AIR: AHERA <input type="checkbox"/> Mod. AHERA <input type="checkbox"/>	<6hr <input type="checkbox"/>	24 hr <input type="checkbox"/>	3-5d <input type="checkbox"/>	
	Water*: Water <input type="checkbox"/> Sludge <input type="checkbox"/>	1-2d <input type="checkbox"/>	3-5d <input type="checkbox"/>	N/A	
	Annex2: Chatfield <input type="checkbox"/> Full <input type="checkbox"/>				
	Vacuum Dust (ASTM)	3-5d <input type="checkbox"/>	5-10d <input type="checkbox"/>	N/A	
Pb by FLAA	Analyte: Pb Other	<6 hrs <input type="checkbox"/>	2-3 days <input type="checkbox"/>	N/A	
	Filter: MCE <input type="checkbox"/>				
	Matrix: Paint: by Area <input type="checkbox"/> by Weight <input type="checkbox"/>				
		Soil <input type="checkbox"/>			
	Wipe <input type="checkbox"/>				
Initial here certifying wipes used are ASTM E1792 compliant <input type="checkbox"/>					
Fungi	Air Sample: Zef <input type="checkbox"/> Aller <input type="checkbox"/> Oth <input type="checkbox"/>	<6 hrs <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A	
	Bulk: Sample <input type="checkbox"/> Swab <input type="checkbox"/>				
	Tape: Qualitative (%) <input type="checkbox"/> or Quantitative (cm2) <input type="checkbox"/>				
Soot	ASTM D6602-03B	Optical <input type="checkbox"/>	<6r <input type="checkbox"/>	1-2 days <input type="checkbox"/>	N/A
		Optical & TEM <input type="checkbox"/>	1-2 days <input type="checkbox"/>	3-5days <input type="checkbox"/>	N/A
Other		Call	Call		

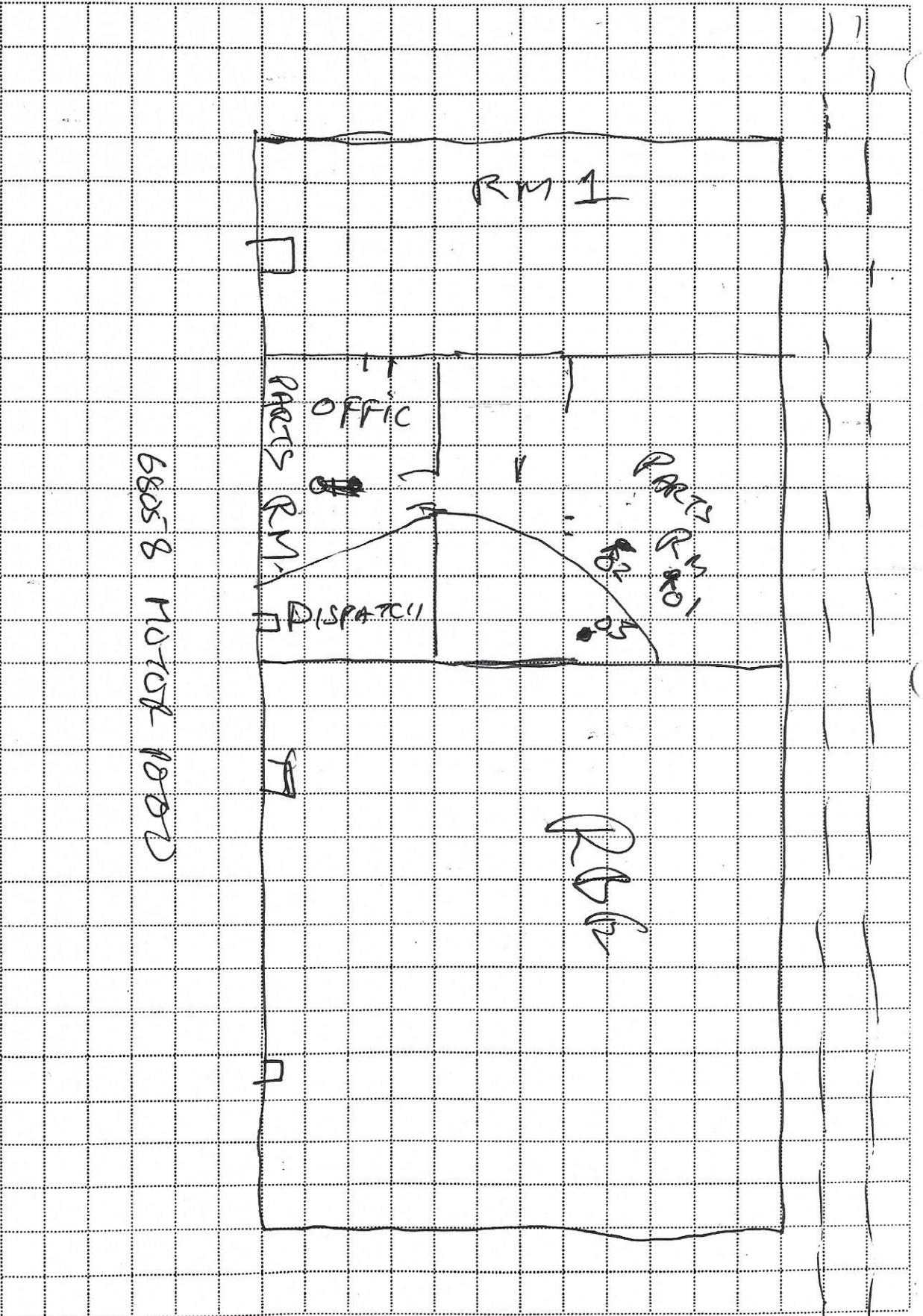
Sample Number	Description/Location (include agar type/maker/exp. Date)	Sample Date	Sample Time	Vol/Area
1) 68057-01	PUTTY WEST SIDE OF BLDG	2-26-14		
2) 02	PUTTY WEST SIDE OF BLDG	2-26-14		
3) 03	PUTTY EAST SIDE OF BLDG	2-26-14		
4) 04	PUTTY EAST SIDE OF BLDG	2-26-14		
5) 05	PUTTY STH SIDE OF BLDG	2-26-14		
6) 06	PUTTY STH SIDE OF BLDG	2-26-14		
7)				
8)				
9)				
10)				
11)				
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: 	Date: 2/27/14	Time: 7:40AM	3) Relinquished by:	Date:	Time:
2) Received by: 	Date: 2-28-14	Time: 10:30	4) Received by:	Date:	Time:
* TEM Water: Sampler's name Required by State of Arizona			Print Name	Page 1 of 1	

Review of Analysis Request (Initials) gjl

Note: Data completed by client (including number and identity of samples) is assumed to be correct until it is verified at time of sample preparation.

201401996



Address:
 Building: 68058
 Homogeneous Area ID:
 Functional space or room:

Date: 8/2/12

Inspector: T/E

Signature: [Handwritten Signature]

IRWIN

LEAD BASED PAINT SAMPLE PLAN (Lead swab tests)

Date: 8.2.12

Work Order #: 1-223387

Building #: 68058

Work Description: L.B.P. CHECK

Sample #	Description	Location	Results
1	TAN COLORED PAINT ON WOOD SIDING	FRONT OF BLDG	POS
2	WHITE COLORED PAINT ON WOODEN DOOR JAMB	" " "	NEG
3	WHITE COLORED PAINT ON WOODEN DOOR	" " "	NEG
4	BROWN BROWN COLORED PAINT ON WOODEN WINDOW TRIM	" " "	POS
5	BROWN PAINT ON WOODEN TRIM	DOORWAY IN FRONT OF BLDG.	POS
6	WHITE PAINT ON SID WOODEN SIDING	DOORWAY IN FRONT OF BLDG	NEG
7	WHITE PAINT ON WOODEN DOOR JAMB	DOORWAY IN FRONT OF BLDG	NEG
8	WHITE PAINT ON METAL DOOR	FRONT OF BLDG	NEG
9	BROWN PAINT ON WOODEN SLIDING DOOR	" " "	POS
10	^{BROWN} TAN PAINT ON WOODEN WINDOW TRIM	" " "	NEG
11	TAN PAINT ON WOODEN SIDING	" " "	POS
12	WHITE PAINT ON WOODEN DOOR	" " "	NEG
13	WHITE PAINT ON WOODEN DOOR	" " "	NEG
14	WHITE PAINT ON WOODEN DOOR JAMB	" " "	NEG

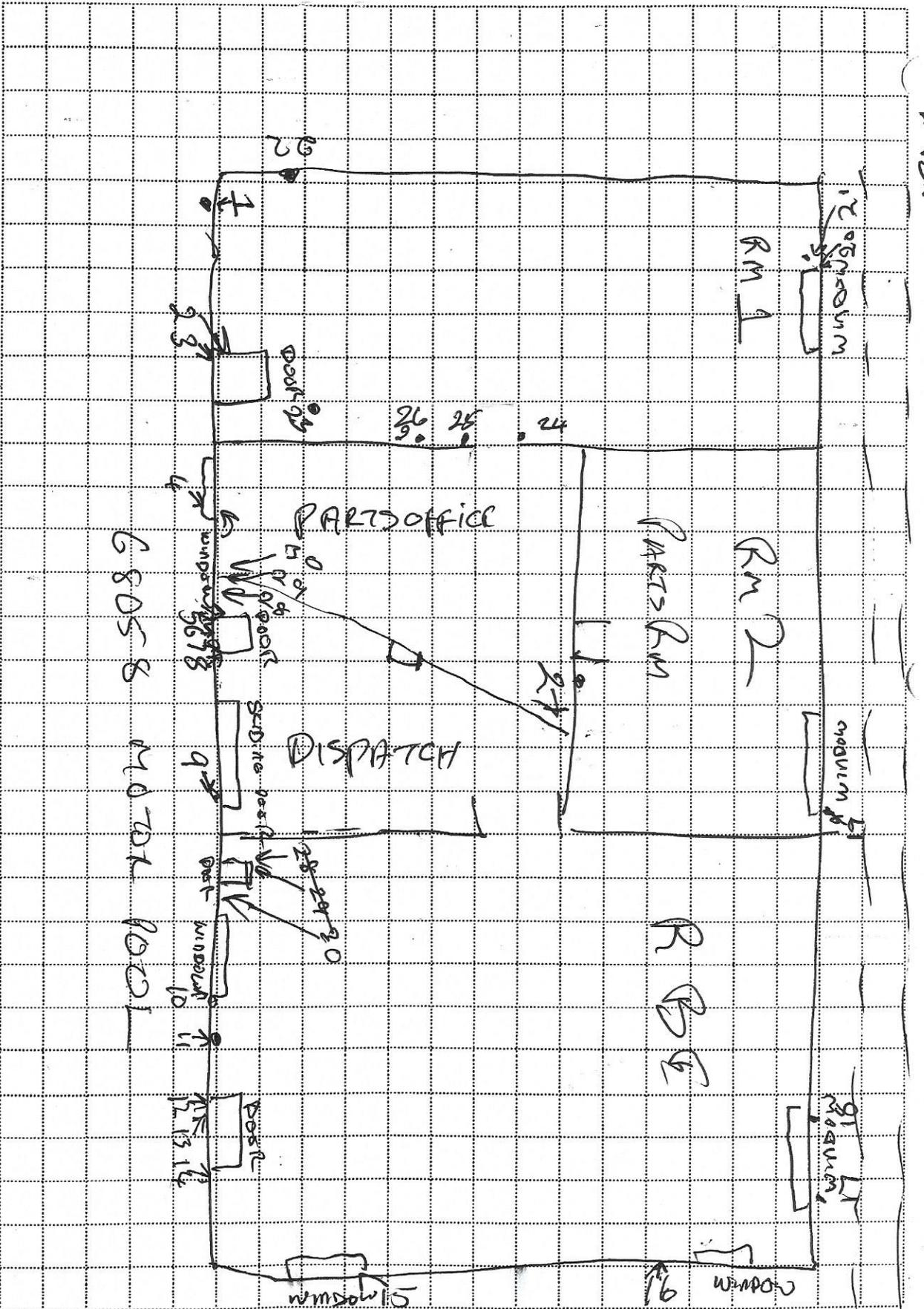
Work Order #: 1-223387Building#: 68058

Sample #	Description	Location	Results
15	BROWN PAINT ON WOODEN TRIM	RIGHT SIDE OF BLDG	POS
16	TAN PAINT ON WOODEN SIDING	" " " "	POS
17	BROWN PAINT ON WOODEN TRIM WINDOW	BACK OF BLDG	POS
18	TAN PAINT ON WOODEN SIDING	BACK OF BLDG	POS
19	BROWN PAINT ON WOODEN WINDOW SCREEN	" " "	POS
20	BROWN PAINT ON WOODEN WINDOW TRIM	" " "	POS
21	TAN PAINT ON WOODEN SIDING	" " "	POS
22	TAN PAINT ON WOODEN SIDING	" " "	POS
23	GRAY PAINT ON FLOOR	RM 1	NEG
24	WHITE PAINT ON WOODEN DOOR	RM 1	NEG
25	WHITE PAINT ON WOODEN JAMB	RM 1	NEG
26	WHITE PAINT ON DRYWALL	RM 1	NEG
27	WHITE PAINT ON DRY WALL	RM 2	NEG
28	GRAY PAINT ON METAL DOOR	DISPATCH	NEG
29	WHITE PAINT ON DOOR JAMB	" "	NEG
30	WHITE PAINT ON DRYWALL	" "	NEG
31	WHITE PAINT ON DOOR JAMB	R.B.E.	NEG
32	WHITE PAINT ON DRYWALL	R.B.E.	NEG

LRBP

Appendix Area Plan - Field data sheet

Drawing Number: _____



Address: _____
 Building: 68058
 Homogeneous Area ID: _____
 Functional space or room: _____
 Scale: _____

Date: 8/2/12
 Inspector: [Signature]
 Signature: [Signature]



Polarized Light Microscope (PLM) Analysis for Asbestos

JobNumber: 200902377

Client: ALL STAR TECHNICAL SVCS INC

PO BOX 12104

FT HUACHUCA, AZ 85670-2104
Office Phone: (520) 533-5906
FAX: (520) 533-3699

Samples: 3 PLM Rec: 4/8/2009 Method: EPA 600/R-93/116 PLM analysis for asbestos in bulk smp
Client Job: CAB134849R PO Number: 68058
Report Date: 4/9/2009 Date Analyzed: 4/9/2009 Routing Number: -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber analysis and identification is the EPA Method 600/R-93/116. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. We recommend a hydro-separation technique for such samples.

Vermiculite-containing samples may contain trace amounts of asbestiform amphibole that may or may not be detected during routine PLM analysis. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling

process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary:

Job Number: 200902377 CAB134849R

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	68058-01	2009-02377- 1	Roofing	Positive Layer? Yes
Layer # 1	black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 2	Black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 3	Black	roofing roll/shingle	<i>no asbestos detected</i>	
Layer # 4	Black	roof ply	<i>40-50% chrysotile asbestos</i>	
Sample #	68058-02	2009-02377- 2	Adhesive/caulk	Positive Layer? No
Layer # 1	white	sealant	<i>no asbestos detected</i>	
Sample #	68058-03	2009-02377- 3	Adhesive/caulk	Positive Layer? No
Layer # 1	white	sealant	<i>no asbestos detected</i>	
Layer # 2	Black	bitumen	<i>no asbestos detected</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

PLM Analysis Details

Job Number: 200902377 CAB134849R

Sample 68058-01 **Lab Number** 2009-02377- 1 **Sampled:** 4/7/2009 **Condition:** acceptable
Analyzed By RAM 4/9/2009 **An?** OK **Apparent Smp Type** Roofing **Fibrous Solid**
Homogeneous No **# Layers** 4 **Pos Layer?** Yes **# Sub-Samples** 10
Non-Fibrous Components (in approx. decreasing order): bitumen, filler, rock

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	roofing roll/shingle	30	black	1	30-40%	>1-2%	n.d.	-	-	-
2	roofing roll/shingle	25	Black	1	30-40%	>1-2%	n.d.	-	-	-
3	roofing roll/shingle	20	Black	1	30-40%	n.d.	n.d.	-	-	-
4	roof ply	25	Black	1	n.d.	n.d.	40-50%	-	-	-
Total %		100	Average %		20-30%	>1-2%	10-20%	-	-	-

Fiber Identification: cellulose fiber | synthetic fiber (extr) | chrysotile asbestos

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	cellulose fiber	W	F	N	N	H	+	U					
2	synthetic fiber (extruded)	W	E	N	N	H	+	P					
3	chrysotile asbestos	W	A	N	N	L	+	P	1.550	db/ly	sb/o	1.561 1.553	
4													
5													
6													

Sample Analytical Note
 Procedure: teased apart using forceps. Procedure: dissolution of matrix using solvent.

Sample 68058-02 **Lab Number** 2009-02377- 2 **Sampled:** 4/7/2009 **Condition:** acceptable
Analyzed By RAM 4/9/2009 **An?** OK **Apparent Smp Type** Adhesive/caulk **Non-fibrous Solid**
Homogeneous No **# Layers** 1 **Pos Layer?** No **# Sub-Samples** 3
Non-Fibrous Components (in approx. decreasing order): filler, binder,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	sealant	100	white	1	n.d.	-	-	-	-	-
Total %		100	Average %		n.d.	-	-	-	-	-

Fiber Identification: none

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	none												
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: teased apart using forceps. Procedure: dissolution of matrix using solvent. A silver paint was present but was too thin to analyze.

PLM Analysis Details

Job Number: 200902377 CAB134849R

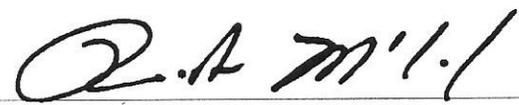
Sample 68058-03 Lab Number 2009-02377-3 Sampled: 4/7/2009 Condition: acceptable
 Analyzed By RAM 4/9/2009 An? OK Apparent Smp Type Adhesive/caulk Non-fibrous Solid
 Homogeneous No # Layers 2 Pos Layer? No # Sub-Samples 4
 Non-Fibrous Components (in approx. decreasing order): filler, binder, bitumen

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	sealant	95	white	1	n.d.	-	-	-	-	-
2	bitumen	5	Black	1	n.d.	-	-	-	-	-
Total %		100	Average %		n.d.	-	-	-	-	-
Fiber Identification:					none					

Fibers								Refractive Index Determinations				
	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per
1	none											
2												
3												
4												
5												
6												

Sample Analytical Note
 Procedure: tweazed apart using forceps. Procedure: dissolution of matrix using solvent. Bitumen was a part of the top portion of a roof shingle.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
 Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
 Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends; D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
 Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
 Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
 Col Par=dispersion staining colors parallel to the fiber (fiber/halo); b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow; vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
 RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: ROBERT A. MCCORMICK

Printed: 09-Apr-09
 Original Print Date: 09-Apr-09



Larry S. Pierce, Approved Accreditation Signatory



Chain-of-Custody Form

Submitted by (Company) All Star Services	
Address P. O. Box 12104	
City, State, Zip Code Fort Huachuca, AZ 85670	
Phone (520) 533-5906	FAX (520) 533-3699

Invoice to (Company) Same as above	
Address	
City, State, Zip Code	
Phone	FAX

Contact (print) B. BARNES
Sampled by (signature) <i>[Signature]</i>
Job Number or Project Name CAB134849R
PO Number 68058

Asbestos by PLM	Improved	Interim	Turn-around time (business days)		
	Analyze all samples? Yes No		Plan	Basic	Ext.
			<6 hrs	1-3 days	15-30 days
	Single Layer Protocol Yes No				
Fibers by PCM	7400(Area)	ORM (Personal)	<4 hrs	24 hrs	3-5 days
Asbestos by TEM	AIR: AHERA	Mod. AHERA	<6 hrs	24 hrs	3-5 days
	Water: Water	Sludge	1-2 days	3-5 days	10 days
	Annex 2: Chatfield	Full			
	Vacuum Dust (ASTM)		3.5 days	5-10 days	N/A
Metals by FLAA	Analyte: Cd Cr Cu Ni Pb Zn		<6 hrs	2-3 days	N/A
	Matrix: Filter: MCE FG				
	Paint: by Area by Weight				
	Soil				
	Wipe				
	Initial here certifying wipes used are ASTM E1782 compliant				
Fungi	Air Sample: Zefon Other		<6 hrs	1-2 days	N/A
	ID/Count: Bulk Swab				
	Tape: Qualitative (%)				
	Tape: Quantitative (cm2)				
			7 days Only		
Dust	NIOSH 500		<4 hrs	24 hrs	N/A
Other			Call	Call	

Review of Analysis Request _____ Date _____

Sample Number	Description/Location (include room/breakroom/area, Date)	Sample Date	Sample Time	Vol/Area
1) 68058-01	ROOF CORE / SOUTHWEST CORNER	7 APR 09		
2) ↓ -02	ROOF JACK TAR / PEAK VENT CAP	↓		
3) ↓ -03	ROOF JACK TAR / EVAP COOLER	↓		
4)				
5)				
6)				
7)				
8)				
9)				
10)				
11)				
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: <i>[Signature]</i>	Date: 7 APR 09	Time: 10:30	3) Relinquished by:	Date:	Time:
2) Received by: <i>Randy Knowles</i>	Date: 4-8-9	Time: 10:39	4) Received by:	Date:	Time:
* TEM Water, Sampler's name Required by State of Arizona	Print Name				

FedEx



Polarized Light Microscope (PLM) Analysis for Asbestos

JobNumber: 201103086

Client: ALL STAR TECHNICAL SVCS INC

PO BOX 12104

FT HUACHUCA, AZ 85670-2104

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 1 PLM **Rec:** 3/28/2011 **Method:** EPA 600/R-93/116 PLM analysis for asbestos in bulk smp
Client Job: TAU087891R **PO Number:** 68058
Report Date: 3/30/2011 **Date Analyzed:** 3/30/2011 **Routing Number:** -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber analysis and identification is the EPA Method 600/R-93/116. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Polutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. We recommend a hydro-separation technique for such samples.

Vermiculite-containing samples may contain trace amounts of asbestiform amphibole that may or may not be detected during routine PLM analysis. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling

process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary:

Job Number: 201103086 TAU087891R

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	<i>Asbestos Results</i>	
Sample #	68058-01	2011-03086- 1	Flooring	Positive Layer? No
Layer # 1	tan	floor tile	<i>no asbestos detected</i>	
Layer # 2	black	mastic	<i>no asbestos detected</i>	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

PLM Analysis Details

Job Number: 201103086 TAU087891R

Sample 68058-01 **Lab Number** 2011-03086-1 **Sampled:** 3/24/2011 **Condition:** acceptable
Analyzed By RAM 3/30/2011 **An?** OK **Apparent Smp Type** Flooring Non-fibrous Solid
Homogeneous No **# Layers** 2 **Pos Layer?** No **# Sub-Samples** 6
Non-Fibrous Components (in approx. decreasing order): filler, polymer, powder

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	floor tile	95	tan	1	n.d.	-	-	-	-	-
2	mastic	5	black	1	5-10%	-	-	-	-	-
Total %		100	Overall %		<=1%	-	-	-	-	-
Fiber Identification:					cellulose fiber					

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	cellulose fiber	W	F	N	N	H	+	U					
2													
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of floor tile matrix and mastic using solvent.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
 Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
 Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends;
 D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
 Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
 Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
 Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow;
 vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
 RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber



Analyst: ROBERT A. McCORMICK

Printed: 30-Mar-11

Original Print Date: 30-Mar-11



Larry S. Pierce, Approved Accreditation Signatory



Chain-of-Custody Form

Submitted by (Company) All Star Services	
Address P. O. Box 12104	
City, State, Zip Code Fort Huachuca, AZ 85670	
Phone (520) 533-5906	FAX (520) 533-3699

Invoice to (Company) Same as above	
Address	
City, State, Zip Code	
Phone	FAX

Contact (print) B. Barnes
Sampled by (signature) <i>B. Barnes</i>
Job Number or Project Name TAU087891R
PO Number 68058

Sample Method Requested ONLY ONE METHOD per COC			Turn-around-time (Circle one)		
			Rush	Norm	Ext.
Asbestos by PLM	Improved	Interim	<6 hrs	1-3 days	15-30 days
	Analyze all samples? Yes	No			
	Analyze 'til positive found (ATPF) If so then by Layer or Sample				
	Single Layer Protocol Yes Np				
Fibers by PCM	7400(Area)	ORM (Personal)	<4 hrs	24 hrs	3-5 days
Asbestos by TEM	AIR: AHERA	Mod. AHERA	<6 hrs	24 hrs	3-5 days
	Water*: Water	Sludge			
	Annex2: Chatfield	Full	1-2 days	3-5 days	10 days
	Vacuum Dust (ASTM)				
Metals by FLAA	Analyte: Cd Cr Cu Ni Pb Zn		<6 hrs	2-3 days	N/A
	Matrix: Filter: MCE FG				
	Paint: by Area by Weight				
	Soil				
	Wipe				
	Initial here certifying wipes used are ASTM E1792 compliant				
Fungi	Air Sample: Zefon Other		<6 hrs	1-2 days	N/A
	ID/Count: Bulk Swab				
	Tape: Qualitative (%)				
	Tape: Quantitative (cm2)				
	Culturable Air Bulk/Dust Swab		7 days Only		
Dust	NIOSH 500		<4 hrs	24 hrs	N/A
Other			Call	Call	

Review of Analysis Request _____ Date _____

Sample Number	Description/Location (include gear type/maker/exp. Date)	Sample Date	Sample Time	Vol/Area
1) 68058-01	12X12 TAN FLOOR TILE +	24 MAR 11		
2)	BLACK MASTIC/			
3)	FLOOR 68058			
4)				
5)				
6)				
7)				
8)				
9)	Bull THIS JOB FOR			
10)				
11)	DELIVERY			
12)				
13)				
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: <i>B. Barnes</i>	Date: 24 MAR 11	Time: 3:00 PM	3) Relinquished by:	Date:	Time:
2) Received by: <i>Kathy Knudsen</i>	Date: 3-28-11	Time: 10:20	4) Received by:	Date:	Time:

* Print *K/x* *1-1 2011030865*



Polarized Light Microscope (PLM) Analysis for Asbestos in Bulk Sample

JobNumber: 201207405

Client: ALL STAR TECHNICAL SVCS INC

PO BOX 12104

FT HUACHUCA, AZ 85670-2104

Office Phone: (520) 533-5906

FAX: (520) 533-3699

Samples: 3 PLM **Rec:** 8/6/2012 **Method:** EPA 600/R-93/116 The "New" Method; see below
Client Job: 1-1223387 **PO Number:** 68058
Report Date: 8/8/2012 **Date Analyzed:** 8/8/2012 **Routing Number:** -

Method and Analysis Information: Fiberquant Internal SOP: PLMn

Each bulk sample is first dissected under a 7-30x magnification stereo-microscope. This examination is used to determine the general type of sample, how many and what type of layers it has, and initial estimates of fiber types and quantities. Second, liquid media mounts are made of each layer - such mounts may be of selected fibers (used solely for identification purposes) or may be representative of the layer as a whole (used for quantitation purposes). The mounts may be made in a synthetic Canadian balsam, one of several solvents, or in refractive index oils (media of known refractive index). Generally, a variety of different mounts are made: some optimized for fiber visibility, some optimized for fiber identification, and some optimized for fiber quantitation. The mounted slides are then examined at 50-400x magnification on a Nikon Labphot-pol microscope. Optical characteristics are used to identify each observed fiber type; the optical data are contained for each sample on its detail analysis sheet, attached.

Current EPA and NESHAP regulations designate a result of $\leq 1\%$ asbestos as "negative" and $> 1\%$ asbestos as "positive". Samples containing layers that have been determined to be "positive" may have to be handled differently during a renovation or demolition than samples whose layers have been determined to be "negative."

The method of fiber identification and quantitation is the "Standard Operating Procedures for the Analysis of Asbestos in Bulk Samples using Polarized Light Microscopy", Chapter 7 of the Quality Assurance and Management Manual. This SOP and its associated reporting have been designed to satisfy all requirements in both EPA Method 600/M4-82-020 (The Interim Method) and EPA Method 600/R-93/116 (The New Method). The Interim Method is the required method for AHERA (US EPA 40 CFR Pt. 763), but this method calls for the reporting of composited results of multi-layered samples that is no longer an acceptable reporting practice in most circumstances. Current EPA rules, such as NESHAP (US EPA 40CFR Pt. 61), as well as NVLAP accreditation policies, call for separate reporting for each layer of multi-layered samples. The New Method contains the same procedures for identification and quantification of asbestos as does the Interim Method, except that multi-layered samples are reported to comply with the latest US EPA rule. Fiberquant not only reports the asbestos content of each layer of multi-layered samples separately (satisfying current EPA and NVLAP reporting requirements), but Fiberquant also reports what percentage of the sample each layer comprises. Therefore, the results may be arithmetically composited to satisfy the reporting requirements of the Interim Method. The method of fiber quantitation is an estimation technique in which the analysts quantitation is routinely calibrated by reference quantitation standards, and which has been shown to be equivalent in precision and accuracy to point counting. Friability is estimated for the purposes of deciding when to point count. Friabilities determined in the field take precedence over those determined in the laboratory. Those sample layers which are friable and estimated by the analyst to contain $\leq 1\%$ asbestos are point counted using 400 points. Such point counting is required by NESHAP (National Emission Standards for Hazardous Air Pollutants, Nov. 1990) in order to rely on analytical results that are $\leq 1\%$. The coefficient of variation for the estimation quantitation technique is 100% in the range 0-5%. This means that PLM analysis is not capable of conclusively determining whether a layer containing close to 1% asbestos is actually "positive" or "negative". For this reason, Fiberquant refers to results where asbestos was detected but $\leq 1\%$ as "borderline negative", and results where asbestos was $> 1\%$ but $\leq 2\%$ as "borderline positive" to indicate the uncertainty in assigning a "positive" or "negative" label. In the sample summary, "ND" means that no asbestos was detected during the analysis. A "Tr" or "Trace" of asbestos reported is defined for our purposes as the detection of several asbestos fibers during the analysis; this level would be right at the limit of detection for the method. Trace is only reported on the analysis detail - in the summary a trace would be reported as $\leq 1\%$. The limit of detection (the smallest % of asbestos that can be detected) varies greatly depending on the matrix in which the asbestos is found. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 1% stated in the method. During the analysis, the analyst, for Fiberquant identification purposes only, determines the "apparent sample type" and "apparent layer types." It must be emphasized that these types are only what is apparent. Often, different materials appear similar or identical after sampling, so the analyst may assign a type other than what was sampled.

Floor tiles present a special problem for PLM asbestos analysis. Floor tile can contain chrysotile fibers so thin that they cannot be resolved by optical methods. In such a case, we may observe a percentage of asbestos which is lower than the actual percentage, or not observe asbestos at all when some is present. For this reason, floor tiles reported as negative should be confirmed to be negative using transmission electron microscope (TEM) analysis. Likewise, vermiculite insulation materials containing traces of asbestiform asbestos present a problem for routine PLM analysis - the amphiboles are sometimes present in trace amounts inhomogeneously distributed. For this reason, loose vermiculite samples reported as negative should be confirmed to contain no amphibole using hydroseparation techniques.

The samples were analyzed under the following ongoing quality assurance program: Blank samples are routinely analyzed to maintain contamination-free materials. Each analyst has at least a bachelor's degree in physical science, and has also completed extensive training specific to asbestos analysis for 1-3 months before being allowed to analyze client samples. Qualitative reference samples are routinely analyzed to assure that

analysts can identify asbestos and asbestos-look-alike fibers. Quantitative reference samples are routinely analyzed to calibrate and characterize the estimation procedure. Microscope alignment is checked each day. Refractive index oils are calibrated at least quarterly. At least 10% of client samples are re-analyzed from scratch by a different analyst than the original, and any discrepancies are resolved for the sample and similar sample types before the results are reported. All quality checks performed for these samples were in control except as detailed in the "Analytical Notes" below. All analysts participate in interlab round robins and proficiency testing to assure competence. Fiberquant is accredited by NVLAP (Lab #101031) for the analysis of bulk samples for asbestos using PLM. Accreditation does not imply endorsement by the EPA, any other United States governmental agency or any private agency or association. Each lab analysis refers only to the sample tested, and may not, due to the sampling process, be representative of the material sampled. This report may not be reproduced except in full, without the approval of Fiberquant Analytical Services.

Some results may have been calculated using client supplied data, such as volume or area sampled, for which Fiberquant assumes no liability for accuracy.

Job Analysis Notes:

PLM Analysis Summary: Job Number: **201207405** 1-1223387

Sample Number		Lab Number	Apparent Sample Type *	Positive Layer Yes or No
Layer	Color	Apparent Layer Type *	Asbestos Results	
Sample #	68058-01	2012-07405- 1	Flooring	Positive Layer? No
Layer # 1	tan		no asbestos detected	
Layer # 2	black		<=1% chrysotile asbestos	
Sample #	68058-02	2012-07405- 2	Acoustical Tile	Positive Layer? No
Layer # 1	white		no asbestos detected	
Layer # 2	off-white		no asbestos detected	
Sample #	68058-03	2012-07405- 3	Wall System	Positive Layer? No
Layer # 1	off-white		no asbestos detected	
Layer # 2	white		no asbestos detected	
Layer # 3	tan		no asbestos detected	
Layer # 4	white		no asbestos detected	

* Apparent Sample Types and Apparent Layer Types are as they appeared to the analyst. Since many types of materials appear similar after sampling damage, the apparent type of material may not be the actual type of material.

PLM Analysis Details

Job Number: 201207405 1-1223387

Sample 68058-01 **Lab Number** 2012-07405-1 **Sampled:** 8/2/2012 10:00 **Condition:** acceptable
Analyzed By GV 8/8/2012 **An?** OK **Apparent Smp Type** Flooring Non-fibrous Solid
Homogeneous No **# Layers** 2 **Pos Layer?** No **# Sub-Samples** 6
Non-Fibrous Components (in approx. decreasing order): filler, polymer,

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	floor tile	98	tan	1	n.d.	n.d.	-	-	-	-
2	mastic	2	black	1	>1-2%	<=1%	-	-	-	-
Total %		100	Overall %		<=1%	<=1%	-	-	-	-
Fiber Identification:					cellulose fiber	chrysotile asbestos				

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	cellulose fiber	W	F	N	N	H	+	U					
2	chrysotile asbestos	W	A	N	N	L	+	P	1.550	vb/g	sb/o	1.556 1.553	
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of floor tile matrix and mastic using solvent.

Sample 68058-02 **Lab Number** 2012-07405-2 **Sampled:** 8/2/2012 10:10 **Condition:** acceptable
Analyzed By GV 8/8/2012 **An?** OK **Apparent Smp Type** Acoustical Tile Fibrous Mat
Homogeneous No **# Layers** 2 **Pos Layer?** No **# Sub-Samples** 5
Non-Fibrous Components (in approx. decreasing order): perlite, powder, binder

Layers					Percents of Each Fiber					
#	Layer Type	%	Color	Friability	Fib 1	Fib 2	Fib 3	Fib 4	Fib 5	Fib 6
1	paint	2	white	1	n.d.	n.d.	-	-	-	-
2	acoustical tile	98	off-white	3	10-20%	10-20%	-	-	-	-
Total %		100	Overall %		10-20%	10-20%	-	-	-	-
Fiber Identification:					cellulose fiber	glass fiber				

Fibers									Refractive Index Determinations				
#	Color	Mrph	Iso	Pleo	Bi	Elg	Ext	Oil	Col Par	Col Per	RI Par	RI Per	
1	cellulose fiber	W	F	N	N	H	+	U					
2	glass fiber	CL	D	Y									
3													
4													
5													
6													

Sample Analytical Note
 Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of acoustical tile using acid.

PLM Analysis Details

Job Number: 201207405 1-1223387

Sample 68058-03 Lab Number 2012-07405-3 Sampled: 8/2/2012 10:20 Condition: acceptable
Analyzed By GV 8/8/2012 An? OK Apparent Smp Type Wall System Fibrous Solid
Homogeneous No # Layers 4 Pos Layer? No # Sub-Samples 9
Non-Fibrous Components (in approx. decreasing order): powder, binder,

Table with 2 main sections: 'Layers' and 'Percents of Each Fiber'. 'Layers' table has columns: #, Layer Type, %, Color, Friability. 'Percents of Each Fiber' table has columns: Fib 1, Fib 2, Fib 3, Fib 4, Fib 5, Fib 6. Includes 'Total %' and 'Overall %' rows.

Table with 2 main sections: 'Fibers' and 'Refractive Index Determinations'. 'Fibers' table has columns: #, Color, Mrph, Iso, Pleo, Bi, Elg, Ext. 'Refractive Index Determinations' table has columns: Oil, Col Par, Col Per, RI Par, RI Per.

Sample Analytical Note
Procedure: tweased apart using forceps. Procedure: dissolution of paint matrix using solvent. Procedure: dissolution of joint compound/texture matrix using acid.

Fr=Friability: 1=very non-friable; 2= non-friable; 3=friable; 4=highly friable
Colors: B=black;BL=blue;BR=brown;CL=clear;G=Green;GY=gray;OR=orange;OW=off-white;PN=pink;PU=purple;R=red;TN=tan;W=white;Y=yellow;V=various
Fiber Morphology: A=fine fibers/bundles, white, sinewy, flexible; B=fine fibers/bundles, w-br, straight, broomed ends; C=fine fibers/bundles, blue, straight, broomed ends; D=fine to coarse fibers, CL-B, brittle; E=coarse fibers,CL or dyed, striated; F=coarse fibers or splinters, W-BR, ribbon-like; G=lath-like or shards, low aspect ratio, may taper
Iso=isotropism - may be yes or no; Pleo=pleochroism - may be yes or no; Bi=birefringence - may be None, Low, Medium or High
Elg=sign of elongation - may be +, - or B (both); Ext=extinction - may be Parallel, Oblique, None or Undulating; Oil=medium used to for dispersion staining
Col Par=dispersion staining colors parallel to the fiber (fiber/halo): b/w=black/white; dg/py=dark gray/pale yellow; vg/y=violet gray/yellow; db/ly=dark blue/lemon yellow; vb/g= vivid blue/gold; sb/o=sky blue/orange; pb/r=pale blue/red; gb/dr=gray blue/dark red; w/b=white/black. Col Perp=same only perpendicular to fiber.
RI Par=refractive index parallel to fiber; RI Perp=refractive index perpendicular to fiber

Galina B. Volkova

Analyst: GALINA B. VOLKOVA

Printed: 08-Aug-12

Original Print Date: 08-Aug-12

Larry S. Pierce

Larry S. Pierce, Approved Accreditation Signatory



Chain-of-Custody Form

Submitted by (Company)	All Star Services	
Address	P. O. Box 12104	
City, State, Zip Code	Fort Huachuca, AZ 85670	
Phone	(520) 533-5906	FAX (520) 533-3699

Invoice to (Company)	Department of Public Works	
Address	3040 Butler Road Building 22422	
City, State, Zip Code	Fort Huachuca, AZ 85613	
Phone	520-533-2837	FAX 520-533-2227

Contact (print)	B. Barnes	
Sampled by (signature)	<i>[Signature]</i>	
Job Number or Project Name	1-223387	
PO Number	68058	

Sample Method Requested ONLY ONE METHOD per COC	Turn-around Time (circle one)			
	Rush	Normal	Ext.	
Asbestos by PLM Improved Interim Analyze all samples? Yes No Single Layer Protocol Yes No	<6 hrs	1-3 days	15-30 days	
	<4 hrs	24 hrs	3-5 days	
	AIR: AHERA Mod. AHERA Water*: Water Sludge Annex2: Chatfield Full Vacuum Dust (ASTM)	<6 hrs 1-2 days 3.5 days	24 hrs 3-5 days 5-10 days	3-5 days 10 days N/A
Metals by FLAA Analyte: Cd Cr Cu Ni Pb Zn Matrix: Filter: MCE FG Paint: by Area by Weight Soil Wipe Initial here certifying wipes used are ASTM E1792 compliant	<6 hrs	2-3 days	N/A	
Fungi Air Sample: Zefon Other ID/Count: Bulk Swab Tape: Qualitative (%) Tape: Quantitative (cm2)	<6 hrs	1-2 days	N/A	
Dust	NIOSH 500	<4 hrs	24 hrs	N/A
Other		Call	Call	

Review of Analysis Request _____ Date _____

Sample Number	Description/Location (include gear type/maker/exp. Date)	Sample Date	Sample Time	Vol/Area
1) 68058-01	1'x1' TA FLOR TILE + MASTIC	8/2/12	10:00 AM	
2) 02	CEILING TILE	8/2/12	10:10 AM	
3) 03	DRY WALL	8/2/12	10:20 AM	
4)				
5)				
6)				
7)				
8)				
9)				
10)				
11)				
12)				
13)	BILL THIS JOB FOR DELIVERY			
14)				
15)				
16)				
17)				
18)				
19)				
20)				

1) Relinquished by: <i>[Signature]</i>	Date: 8/3/12	Time: 7:40	3) Relinquished by:	Date:	Time:
2) Received by: <i>[Signature]</i>	Date: 8-6-12	Time: 10:31	4) Received by:	Date:	Time:

* TEM Water Sampler's name Required by State of Arizona	Print Name	FIX
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201207405 *[Signature]*



FH PROJECT SPECIFIC REQUIREMENTS



DEPARTMENT OF THE ARMY
UNITED STATES ARMY GARRISON
DIRECTORATE OF PUBLIC WORKS
3040 BUTLER ROAD
FORT HUACHUCA, ARIZONA 85613-7010

IMHU-PWH

23 Oct 2019

MEMORANDUM OF UNDERSTANDING

SUBJECT: FORT HUACHUCA FIRE PREVENTION PROJECT SPECIFIC REQUIREMENTS

1. Fire Prevention is essential to protecting our property and personnel on Fort Huachuca. Requirements must be established in a variety of areas for current and future projects to ensure compatibility with systems in place and that proper codes are followed. These requirements will streamline the construction process and answers most questions in advance of pre-construction meetings. These requirements apply to new construction and to renovations of existing facilities.
2. Fort Huachuca Directorate of Emergency Services has prepared the Project Specific Requirements Standard Operating Procedure (SOP) as a resource for DPW, USACE and contractors.
3. The point of contact for this memorandum is the Fire Inspector Keith Read, 520-533-1887 or keith.a.read.civ@mail.mil.

CHAD O. RAMBO
Colonel, MI
Garrison Commander



FH PROJECT SPECIFIC REQUIREMENTS



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FH PROJECT SPECIFIC REQUIREMENTS



Scope: The Fort Huachuca Fire Department Project Specific Requirements is a living document. We make no inference that this document is all inclusive guide to NFPA, UFC, UFGS or IBC standards. This document is as stated “PROJECT SPECIFIC REQUIREMENTS to FORT HUACHUCA, AZ”, a point of reference to individuals performing work on the installation involving the installation, repair and modification of fire alarm, mass notification and sprinkler systems. The installation, testing and acceptance of installed systems will be conducted IAW established guidance. Changes are imminent and constant revision is impractical. Where questions arise and new procedures are implemented, Fort Huachuca Fire Prevention is available for discussion and clarification. Changes that do not affect the core of this document and are not Fort Huachuca specific will not be addressed in this document.

Documentation of testing will be conducted on the most recent NFPA form in circulation for the prescribed test.

1. EMERGENCY VEHICLE REQUIREMENTS:

a. Emergency Vehicle Access

- 1 Provide emergency access lanes with all-weather accessibility to accommodate the Fort Huachuca Emergency Response Vehicles in accordance with NFPA, UFC, and AT/FP requirements.
- 2 Provide emergency response vehicle access as a minimum to two sides of each facility
- 3 Provide emergency response vehicle to three sides of all elementary, middle and high school facilities.

b. Provide ladder vehicle access as a minimum to two sides of each facility and a minimum of three sides of all sleeping quarters, warehouse/storage facilities and primary and secondary schools.

c. Apparatuses Dimensions

	Vehicle ID	GVW	Height	Length	Width	Turning Radius
1	LAD 1320	39,800 lbs	10’0”	57’0”	8’1”	47’7”
2	CRASH 1332	36,000 lbs	11’10”	38’9”	11’0”	110’0”

Note: Crash 1332 is primarily for airfield operations

Note: Width of the LADDER truck is 16’6” - feet with out-riggers extended



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d. Fire Lanes Dimensions

Fire Lanes shall be a minimum width of 20 feet measured edge of roadway to edge of roadway not including storm gutters and curbs.

e. Fire Lanes Marking

1. Emergency access drives and Fire Lanes shall be delineated with 6-inch wide red striping at normal spacing with the words "FIRE LANE NO PARKING" in 4-inch white letters within the stripes at maximum interval of 50 feet. Curb tops and sides painted red. Where no curb exist, provide an 8-inch red strip along the edge of the lane with the words "FIRE LANE NO PARKING" in 4-inch white letters at maximum interval of 50 feet.
2. Provide and install signage along the entire fire lane. Signs shall be a white background with fire lane No Parking symbol and words "Fire Lane" in red.

f. Sidewalks dimensions that support emergency vehicle traffic

Sidewalks designed to support emergency vehicle traffic shall be a minimum of 20' wide (16' paved with 2' structural turf both sides). Coordinate with Fire Chief or design for location requirements. Reference Apparatus Dimensions for Emergency Vehicle design loads.

2. WATER DISTRIBUTION SYSTEM:

a. Fire service mains, hydrants, and appurtenances

1. Install, test, and document fire service mains and their appurtenances in accordance with Unified Facilities Criteria (UFC), Unified Facilities Guide Specification (UFGS), National Fire Protection Association (NFPA), and applicable codes.
2. Private and public water supply systems shall be installed, tested, and maintained in accordance with NFPA 24, NFPA 25, NFPA 291, UFC 3-600-01 and UFC 3-600-02.
3. Fire hydrants shall be provided along required fire apparatus access roads and adjacent public streets
4. Fire hydrants shall be located a minimum of 40-feet from facility.
5. Hydrants shall be located not less than 40-feet from building being protected
6. Maximum fire hydrant spacing shall not exceed 300-feet around facilities
7. Hydrant spacing shall not exceed 600-feet in open air parking areas



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8. Hydrant spacing shall not exceed 1000-feet along undeveloped roadways

b. Existing fire hydrant

Existing fire hydrants shall not be relocated. New fire hydrants shall be installed when existing fire hydrants are required to be relocated.

c. Fire hydrant protection

All fire hydrants located in areas where subject to vehicular damage shall be protected with barriers.

d. Water flow test

Fire Protection Engineer or contractor shall perform a water flow test in accordance with NFPA 291 and UFC in coordination with Fort Huachuca's Fire Prevention Office.

e. Fire Hydrants "NO PARKING" Zone:

1. No parking within 15-foot radius of any fire hydrant.
2. No Parking Zone shall be marked to identify the space that parking is not permitted.
3. Emergency access to Fire Hydrants shall be delineated with 6-inch wide red striping at normal spacing with the words "NO PARKING" in 4-inch white letters within the stripes. Curb tops and sides painted red. Where no curb exist, provide an 8-inch red strip along the edge of the lane with the words "NO PARKING" in 4-inch white letters. Striping and lettering shall be 15-foot radius of fire hydrant.

3. FIRE PROTECTION

a. Sprinkler System

1. Install sprinkler systems in accordance with UFC 3-600-01 and NFPA 13 except as modified herein.
2. Provide separate fire sprinkler service connection for each facility.

b. Install preferred double check backflow preventer.

c. Locate fire department connection (FDC) at readily accessible location from the street or fire lane. Remote FDC is authorized with all weather ground access within 150 feet of the fire department connection and at least one fire hydrant within 150 feet.



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- d. Install a remote inspector test valve on the end of the most remote branch line on each floor or space with control valve assembly. Locate inspector test valve in an accessible location not over 7-feet off the floor where not exposed to freezing. Test drains shall terminate outdoors with appropriate splash guard protection as required.
- e. Test backflow preventer to verify check valves are fully functional and operate in accordance with manufacturer specifications. Certified Backflow Preventer Technician shall perform and post test results with Certification Certificate in waterproof enclosure securely fasten to the backflow preventer.
- f. Test backflow preventer for full forward water flow and documented before sprinkler system can be accepted and placed in service.
- g. Electrically supervise all sprinkler system water control valves to include sectional control, isolation and floor control valves with approved tamper switches. Each tamper switch shall have its own specific address monitored as a supervisory function with building fire alarm system.
- h. Electrically supervise Backflow Preventer Test Connection water control valve in the closed position with approved tamper switch having its own specific address monitored as a supervisory function with building fire alarm system.
- i. Install the “KNOX” company stainless steel 2.5-inch male NST locking FDC caps on each fire department connection. The contractor shall submit “KNOX” FDC locking caps keys to post fire department the day the FDC caps are installed.
- j. Install tamper switch on all Post Indicator Valve and tamper switch monitored by fire alarm system in accordance with NFPA 24, NFPA 72 and Project Specific Requirement.
- k. The use and installation of plastic pipe is prohibited.

4. Standpipe System

- a. Install standpipe system in accordance with UFC 3-600-01, NFPA 14, and NFPA 101 except as modified herein.
- b. Install combination standpipe and sprinkler system in building with four or more stories
- c. Install combination standpipe and sprinkler system in any building regardless of height when the length or width of the building is 200-feet or more
 - 1. Locate first floor hose valve on first floor landing. Install second, third, fourth floors hose valves on highest intermittent landing between each floor.



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2. Install water flow switch on main riser and adjust retard delay between 50 and 60 seconds.
3. Provide Fire Department Connections (FDC) in accordance with NFPA 14 requirements based on number of standpipe risers.
4. Installing contractor shall provide all necessary equipment to properly test standpipe system in accordance with NFPA 14.

5. Fire Pumps

- a. Install fire pumps when required by hydrostatic calculations in accordance with NFPA 20, NFPA 13, and UFC 3-600-01, all applicable codes, except as modified herein.
- b. Permanently install necessary equipment to adequately test fire pump in accordance with NFPA 20, NFPA 25, and UFC 3-600-02.
- c. Install backflow preventer devices on the inlet (suction) side of fire pump.

6. Kitchen Suppression System

- a. All kitchenette and commercial cooking hood and suppression systems shall be installed in accordance with all applicable codes and standards to include NFPA 96, NFPA 17A, UFC 3-600-01, UFC 3-410-01FA, manufacturer recommendations and modifications herein.
- b. Provide a complete pre-engineer “Wet Chemical” suppression system to protect all grease vapors producing equipment.
- c. Wet automatic spray nozzle type suppression system is prohibited.
- d. De-energize all electrical receptacles under and within three feet of the hood.
- e. Connect the suppression system to the building fire alarm system and generate a general evacuation signal upon suppression system activation
- f. Provide two means of manual activation where there are two or more means of egress from the area for each system.
- g. Provide minimum two-liter wet chemical portable fire extinguishers mounted in recess or semi-recess cabinets in all commercial and kitchenette cooking areas.
- h. Provide minimum ten pound Class ABC portable fire extinguisher mounted in recess or semi-recess cabinets in commercial and kitchenette cooking areas for fires other than cooking fires.



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- i. Exhaust fans shall be accessible for cleaning and maintenance.
- j. Complete drawings of the system installation, including the hood(s), exhaust duct(s), and appliances, along with the interface of the fire-extinguishing system detectors, piping, nozzles, fuel shutoff devices, agent storage container(s), and manual actuation device(s), shall be submitted to Fort Huachuca Fire Prevention Office.
- k. Drawing and plans shall be drawn to an indicated scale and shall be reproducible.
 1. 1/8 inch = 1-foot is the smallest drawing scale accepted
 2. Illustrate all appliances on drawing
 3. Illustrate all nozzles and lines such as plenum, duct, and appliance nozzles including supply and branch lines with dimensions
 4. Illustrate all access panels
 5. Illustrate all heat links and manual pull stations
 6. Illustrate all fuel shut-off valves and or electrical circuit breakers
 7. Illustrate reset button and system cylinders
 8. All symbols shall be in accordance with NFPA 170

7. Fire Alarm System and Drawings

- a. New facilities, remodeled and additions will be provided with proper fire alarm and Mass Notification systems throughout entire facility. *Reference UFC 3-600-1, UFC 4-021-01, NFPA 70, NFPA 72 and NFPA 101 Current Editions, except as modified herein.* As-built drawings, at a minimum shall include the following information:
 1. Drawing shall be to an indicated scale
 - a) The 1:8 scales is the smallest acceptable scale
 2. All conduit runs
- b. A scaled, sealed and detailed floor plan with the system designer indicated and the date of design. An elevation view must also be included. Project name, street address, and owner's name; Contractor's name, address, phone number, license numbers, and license classification. This information must be included in the title block that appears on each plan sheet.



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- a) All conduits shall be illustrated as installed overlaid on a floor plan to scale
 - b) Identify all cable circuits within each conduit and direction of travel from “B” side (output) side of the circuit to “A” side (return) side of the circuit.
3. Device and Appliance Locations
- a) Show all devices and detectors with addresses overlaid on a floor plan(s) to scale
 - b) Show all notification appliances (strobes and speakers) with addresses and labels overlaid on a floor plan(s) to scale
 - c) All floors plans shall be to scale with correct room numbers and nomenclatures.
 - d) Physically label each appliance (speaker and strobe) and devices as labeled on as-built drawings
 - e) Labeling shall be on clear or white tape with black letters
 - f) All symbols shall comply with NFPA 170
4. Wiring Drawing
- a) Show all external wiring connections inside all panels to include fire alarm control panel, notification appliance panels, audio control unit, transmitter, and etc.
 - b) Show wiring connections illustration for each device, appliance, module, etc. installed in the system. Example: all incoming wiring connections on a smoke detector and or duct smoke detector, when a module is added to a panel it shall include all the wiring connections between the module and the panel.
5. Point to Point Wiring Diagram
- a) The point to point wiring diagram illustrates the exact wiring connections between device to device, appliance to appliance, panel to device and appliance, panel to panel, and etc.
 - b) All drawings and diagrams shall illustrate exactly the structure and the installation of the system.
 - c) Each drawing shall have the signature and certification number of the Fire Protection Engineer.
6. All symbols shall conform to NFPA 170 Standard Symbols



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- c. A complete set of Fire Alarm System Drawings with a Professional Engineer Seal must be submitted to the Fort Huachuca Fire Prevention Office for approval. Drawings will include the manufacturer information sheets for all control units, all initiating devices, all notification devices; all control/monitor modules, and all supplementary equipment.
 1. The components includes addressable control panel (FACP), autonomous control unit (ACU), local operation consoles (LOC), notification appliance network (strobes and speakers), water flow switches, valve tamper switches, supervisory devices, monitor and control modules, duct detectors, heat detectors, smoke detectors, combination heat and smoke detectors, Monaco transceiver, and other equipment as required by code or Fort Huachuca.
 2. The locations of all the initiating and notification devices must be clearly indicated along with the candela rating of all strobes.
 3. Details of ceiling height and construction.
 4. Fire Alarm Control Panels/Annunciator Panels:
 - a) The Fort Huachuca Office of Fire Prevention has mandated that Monaco MAPP+ or MAPPX addressable point reporting be installed for all new fire alarm systems being installed.
 - b) Fire alarm control panel (FACP) and autonomous control unit (ACU) will be located in atmosphere friendly electrical or mechanical room
 - c) Annunciator panel and local operating console (LOC) will be located just inside the main entrance and clearly visible.
 - d) The Fire Alarm Control Panel must be U.L. or F.M. approved.
 - e) The company installing the Fire Alarm Control Panel must be able to provide service to the unit within 24 hours during the one-year warranty period. Once the one-year warranty has expired, Fort Huachuca's certified alarm technicians must be able to receive technical assistance over the phone or the manufacturer must provide on-site assistance within 1 hour of fire alarm deficiency.
 - f) Separate Zones are required for Detection and Pull Boxes, Flow Switches, Tamper Switches, Duct Detectors, or any other devices used, for each floor in multi-story buildings, and Hood and Duct Suppression Systems. The capability to disable each zone shall be provided.



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- g) Fire Alarm Control Panel shall not be installed outside a building.
- h) Fire Alarm Control Panels, Sub-Panels, Annunciator Panels, Manual Pull Stations, etc, shall be keyed to Fort Huachuca Protocol, CAT 415A. Password protected fire alarm control panels are not permitted unless approved by the Fort Huachuca Office of Fire Prevention.
- i) Fire Alarm Control Panels must have two independent power supplies. The primary power supply being a dedicated commercial light and power branch circuit. The secondary power supply will consist of storage battery and charging unit. The secondary power supply must be able to make the Fire Alarm Control Panel operational within 30 seconds and provide a minimum back up power supply of 72 hours. The alarm must be able to sound in full alarm for 15 minutes while on back up battery power. Either power supply should be supervised and send a trouble signal to Fort Huachuca Fire Department's Dispatch Center.
- j) Programming sheets shall be supplied to the Fire Prevention office for D21 input by a Monaco trained person within the FHFD organization.
- k) The location of the dedicated branch circuit disconnecting means shall be permanently identified at the control unit.
- l) The individual branch circuit dedicated to the Fire alarm Control Panel shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.
- m) For fire alarm systems the circuit disconnecting means shall be identified as "FIRE ALARM CIRCUIT."
- n) For fire alarm systems the circuit disconnecting means shall have a red marking.
- o) The letters "F.A.C.P." (Min. size shall be 4" in height) shall be installed on the Doors for mechanical rooms housing the Fire Alarm Control. FHFD Ordinance
- p) A toggle switch must be installed to be able to disconnect the Fire Alarm Control Panel's secondary power source.
- q) The Annunciator Panel for the alarm/suppression systems must be located just inside of the main entrance and visible from the main entrance as well.
- r) The Annunciator panel must indicate all functions of the Fire Alarm Control Panel and also have reset and disable capabilities, the same as the FACP.



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- s) A zone map, encompassing a floor plan shall be provided near each Fire Alarm Control Panel and Fire Alarm Annunciator Panel.
 - t) All transceivers must be compatible with the Fort Huachuca Fire Department Monaco D-21 Radio Alarm System and must be a Monaco transceiver for proper interface with the Monaco D-21 Radio Alarm System.
 - u) Fire Alarm Control Panels, Sub-Panels, Annunciator Panels, Manual Pull Stations, etc, shall be keyed to Fort Huachuca Protocol, **CAT 415A**. Password protected fire alarm control panels are not permitted unless approved by the Fort Huachuca Fire Prevention Office.
5. Power connection; electrical breaker controlling the alarm panel must be equipped with a breaker lock and will be red in color.
 6. Battery and voltage drop calculations for the entire system. The total number and amperage of the batteries to be utilized must be clearly indicated.
 7. Electrical wiring diagram, type and size.
 8. Manufacturers, model numbers, and listing information for all the equipment, devices, and materials to be installed.
 9. The interface of all fire safety control functions.
 10. All submitted plans must provide a symbol legend.
 11. Riser diagram showing general arrangement of the system and type and circuits in each riser
 12. Wiring diagram showing the interconnection of panels and devices, indicating the type and number of fire alarm system components/devices on each circuit.
 13. Provide manual pull stations at all exterior entrances/exits to include such rooms as mechanical, electrical, and communication rooms. Provide notification appliances network in such like rooms.
 14. All panel boxes shall be “red” in color
 15. Detection devices that operate independent from fire alarm system are prohibited.



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16. The fire alarm/mass notification system shall have the ability and means to provide up to 52 zone points to the Monaco transmitter. Programming shall be approved by the Fort Huachuca Fire Prevention Office.
 17. All fire/mass notification conductors shall be housed in “red” conduit. Junction (pull) boxes and covers shall be “red” in color.
 18. Conductors shall go from device to device and appliance to appliance without splices.
 19. Use terminal boards when wire splices are unavoidable such a sprinkler Butterfly type water control valve to connect monitor module and terminating resistor to pre-installed pigtail wires.
 20. Electrical wire nuts, crimped connectors or twisting of conductors is prohibited.
 21. All panels and associated equipment shall operate on the secondary power source for 72-hours in (supervisory) state and 15-minutes in alarm. It is the contractor responsibility to coordinate battery test with Fort Huachuca Fire Prevention Office.
 22. Locate smoke detectors a minimum of five feet away from air intake, diffusers, ceiling fans, and vapor and steam producing rooms or areas, such as bathrooms and kitchens.
- d. The Fire Sprinkler riser and Fire Alarm Control Panel shall be in the same mechanical room with exterior access for fire crews and maintenance personnel. Doors leading to equipment will be keyed to Fort Huachuca protocol.
 - e. Fire Alarm Systems and Mass Notification System must be compatible with one another.
 - f. Design and install the fire/mass notification system in accordance with latest version of NFPA 72, 70, 101, and UFC 4-021-01, UFC 4-010-01, UFC 3-600-01, Unified Facilities Guide Specification (UFGS) 28-31-76 and UL 864, except as modified herein.

8. Mass Notification Messages

- a. Messages to be Pre-programmed IAW Fort Huachuca requirements:

1. **FIRE EMERGENCY / FIRE ALARM:**

AUDIBLE [Audible must sound for not less than 180 seconds (NFPA 72)] in the following sequence:

Alert Sound – NFPA Temporal 3 (T-3) - 422-775Hz upward sweep over 850 ms for three-pulses each separated by 1 second followed by a 1.5 second delay (repeat 2 cycles)



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Announcement: Voice – Donna (repeat 2 cycles):

Option 1: *“A FIRE EMERGENCY HAS OCCURRED; PLEASE LEAVE THE BUILDING BY THE NEAREST EXIT.”*

VISIBLE [Visible must flash/operate until system is reset]:

- White Strobe or other listed white appliance.

2. CARBON MONOXIDE DETECTION:

AUDIBLE [Audible must sound for not less than 180 seconds (NFPA 72)] in the following sequence:

Alert Sound – Temporal 4 (T-4) pattern tone - 520Hz over 850 ms for four-pulses each separated by 1 second followed by a 1.5 second delay (repeat 2 cycles)

Announcement: Voice – Donna (repeat 2 cycles):

Option 1: *“CARBON MONOXIDE HAS BEEN DETECTED IN THE BUILDING; PLEASE LEAVE THE BUILDING BY THE NEAREST EXIT.”*

VISIBLE [Visible must flash/operate until system is reset]

3. BOMB THREAT:

AUDIBLE [Audible must sound for not less than 180 seconds] in the following sequence:

Alert Sound – Hi-Lo - 780 to 600 hz alternately, 0.52 each (repeat 2 cycles)

Announcement: Voice - Donna (repeat 2 cycles):

“A BOMB THREAT OR ACTUAL BOMB HAS BEEN REPORTED WITHIN OR AROUND THE BUILDING. PLEASE TAKE APPROPRIATE ACTION AND EVACUATE THE BUILDING.”

VISIBLE [Visible must flash/operate until system is reset]

4. INTRUDER SIGHTED:

AUDIBLE [Audible must sound for not less than 180 seconds] in the following sequence:

Alert Sound – Siren - 600-1250 hz up and down sweep in 4 seconds; 1.5 second delay (repeat 2 cycles)



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Announcement: Voice - Donna (repeat 2 cycles):

“INTRUDER OR HOSTILE PERSON SIGHTED WITHIN OR AROUND THE BUILDING. PLEASE TAKE APPROPRIATE ACTION AND SHELTER IN PLACE.”

VISIBLE [Visible must flash/operate until system is reset].

5. SHELTER IN PLACE:

AUDIBLE [Audible must sound for not less than 180 seconds] in the following sequence:

Alert Sound – Siren - 600-1250 hz up and down sweep in 4 seconds; 1.5 second delay (repeat 2 cycles)

Announcement: Voice – Donna (repeat 2 cycles):

-Option 1: *“A [force protection emergency] HAS BEEN DECLARED; PLEASE TAKE SHELTER IN A DESIGNATED SAFE AREA IMMEDIATELY.”*

VISIBLE [Visible must flash/operate until system is reset].

6. EVACUATE:

AUDIBLE [Audible must sound for not less than 180 seconds] in the following sequence:

Alert Sound – Hi-Lo - 780 to 600 hz alternately, 0.52 each (repeat 2 cycles)

Announcement: Voice – Donna (repeat 2 cycles):

-Option 2: *“A [force protection emergency] HAS BEEN DECLARED; PLEASE LEAVE THE BUILDING BY THE NEAREST EXIT AND REPORT TO YOUR ASSEMBLY LOCATION.”*

VISIBLE [Visible must flash/operate until system is reset].

7. EMERGENCY WEATHER:

AUDIBLE [Audible must sound for not less than 180 seconds] in the following sequence:

Alert Sound – NOAA Standard alert tone - 1050 hz (8 seconds)

Announcement: Voice - Donna (repeat 2 cycles):



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Option 1: *“A [weather] [] EMERGENCY HAS BEEN DECLARED; PLEASE TAKE SHELTER IN A DESIGNATED SAFE AREA IMMEDIATELY. “*

VISIBLE [Visible must flash/operate until system is reset].

8. ALL CLEAR:

AUDIBLE [Audible must sound for not less than 180 seconds] in the following sequence:

Alert Sound – Ding-Dong – Percussive pairs of 700 and 570 Hz tones each damped to zero (one cycle)

Announcement: Voice – Donna (repeat two cycles):

“THE EMERGENCY HAS BEEN RESOLVED; RETURN TO NORMAL OPERATIONS”

VISIBLE [Visible must flash/operate until system is reset].

9. SYSTEM TEST:

AUDIBLE [Audible must sound for not less than 180 seconds] in the following sequence:

Alert Sound – NOAA Standard alert tone - 1050 hz (8 seconds)

Announcement: Voice – Donna (repeat two cycles):

“TEST, TEST, TEST, THIS IS AN EMERGENCY NOTIFICATION AUDIO SYSTEM TEST; YOU MAY CONTINUE NORMAL OPERATIONS, TEST, TEST, TEST.”

VISIBLE [Visible must flash/operate until system is reset].

- b. The microphone at the LOC will have priority over any prerecorded message button.
- c. When activating or keying the microphone at the LOC or ACU, the alert strobes shall activate.
- d. The LOC microphone located by remote annunciator shall take priority over any other LOC microphone or the live voice message from fire dispatch or pre-recorded messages.



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9. Fire Alarm/Fire Suppression Acceptance Tests

- a. Initial Acceptance Testing will be conducted on all new systems. Reacceptance Testing will be conducted on all system of initiating device, notifying appliance or control relays. Reacceptance Testing will also be conducted on all modifications or repairs to control equipment hardware or when changes are made to site specific software. Initial and Reacceptance tests for fire alarm systems shall be conducted to ensure system operation in accordance with the design documents.
- b. Perform and record all test results and what is required by all applicale codes and manufacturer to include but not limited to NFPA 72 chapter 10, UFC 3-600-01, UFC 4-010-01, UFC 4-021-01, UFGS 28-31-76 (13859), and applicable codes and standards except as modified herein.
- c. A complete accurate set of as-built drawings and inspection and testing results document are required to perform initial fire alarm and mass notification acceptance test. It is the contractor responsibility to coordinate and provide these documents to Fort Huachuca Fire Prevention Office prior to acceptance test date.
- d. All individuals involved in the design, installation, programming, and testing of the system shall certify all drawings, manuals, and test results are accurate.
- e. Record of Completion shall be signed upon completion and acceptance of the fire alarm/fire suppression/MNS testing.

10. FIRE ALARM INSEPTION, TESTING AND SERVICING

- a. Personnel installing or repairing systems shall provide evidence of their qualification or certification when requested by the Authority Having Jurisdiction (AHJ).
- b. Personnel, either individually or from affiliation must be registered, licensed or certified by the state or local authority.
- c. Qualified personnel shall be factory trained and certified for Monaco systems. For all other systems knowledge and demonstrated experience shall be exceptable.
- d. Personnel programming a system shally be certified by the system manufacturer.
- e. Regardless of qualification and certification, if the AHJ loses confidence in the individuals competency, that individual shall not be authorized to continue with inspection, testing or servicing until such a time that compentency can be assessed and accepted by the AHJ.



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11. ELECTROMAGNETIC DOOR HOLDERS

- a. Where indicated on drawings, provide magnetic fire door hold open devices. The electromagnetic holding devices shall be designed to operate on 24-VDC and require not more than 3-watts of power to develop 25-psi of holding force.
- b. Under normal conditions, the magnetic shall attract and hold the doors open
- c. The initiation of any fire alarm shall cause the release of the electromagnetic door holding device permitting the door to be closed by the door closer. Operation shall be fail safe with no moving parts. Electromagnetic door hold-open devices shall not be required to be held open during building power failure. The device shall be UL listed based on UL 228 tests.

12. KNOX BOX

- f. The Fort Huachuca Fire Department (FHFD) approved the installation of access boxes on facilities within Fort Huachuca. NFPA 1-16.3.4.3 (buildings under construction) and NFPA 1-18.2.2.1 (existing buildings) require that a key box with keys to a designated area of a structure be installed on a building in an approved location when access to the structure or areas of the structure are determined by the Fire Chief or his designee to be difficult due to security features of the building. These guidelines provide information regarding which buildings will be required to install a Knox Box, how to obtain a Knox Box and where they are to be located on the building.

1. Buildings requiring a KnoxBox:

- a) Any facility that has installed within it an automatic fire suppression system, or an elevator will require a Knox Box.
- b) Any commercial building that does not have 24 hour operations will require a Knox Box.
- c) Residential facilities with fire suppression system.

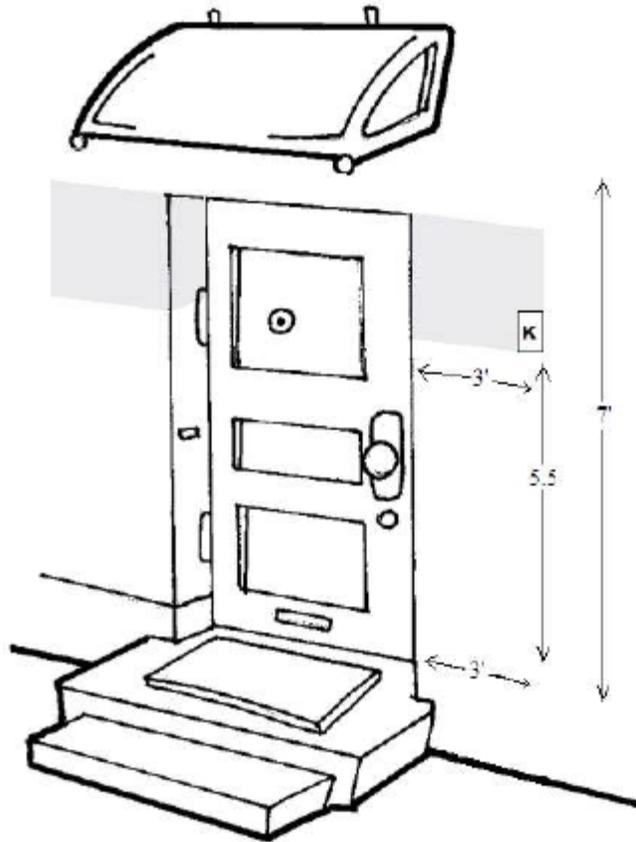
2. Location:

- a) Knox Boxes must be installed within three feet horizontally of the principle entrance door of the building or within three feet horizontally of another entrance to the building which is acceptable to the fire department. They need to be installed no less than 5.5 feet vertically from the threshold of the door and no more that 6.5 feet vertically from the threshold of the door. However, the preference of the FHFD is that Knox Boxes be installed at the 5.5 foot level.
- b) In the diagram below, a Knox Box may be installed any where in the gray shaded area only.



FH PROJECT SPECIFIC REQUIREMENTS

c)



3. Keys Required:

- a. With the exception of Knox Boxes located on residential buildings, all Knox Boxes must contain the key for the principle entrance, the key for every other keyed exterior entrance, and any keys to interior doors deemed required by FHFD. All keys in the Knox Box must be clearly labeled with regard to their function. Any time the locks on the doors for which the keys are stored in the Knox Box are changed, the facility manager must immediately notify the FHFD and immediately provide the FHFD with the keys for the new locks. On residential buildings Knox Boxes need only contain the keys to portions of the building that includes the fire suppression riser.



FH PROJECT SPECIFIC REQUIREMENTS



4. How to Obtain a KnoxBox:

- a. Knox Boxes must be ordered directly from the Knox Box Company
- b. Contact the Fire Prevention Office at 533-1887 or 533-7009 for instructions on ordering Knox Boxes specifically for Fort Huachuca.

13. PORTABLE FIRE EXTINGUISHERS

- a. Install portable dry chemical (Class ABC) fire extinguishers in accordance with all applicable NFPA and UFC criteria including the manufacturer recommendations.
- b. Provide ten-pound portable dry chemical fire extinguishers with flush or semi-mounted approved cabinets in accordance with NFPA 10 and UFC 3-600-01
- c. Install fire extinguishers along the path of egress in clear view
- d. Where visual obstructions cannot be avoided, provide signage to indicate the extinguisher location.
- e. Provide minimum two-liter size wet chemical portable fire extinguishers mounted in recess or semi-recess cabinets in all commercial and kitchenette cooking areas.
- f. Provide minimum ten pound Class ABC portable fire extinguishers mounted in recess or semi-recess cabinets in commercial and kitchenette cooking areas for fires other than cooking fires.
- g. Install all portable fire extinguishers with the top of the fire extinguisher between 48" - 60" from the finish floor.

14. HEATING, VENTILATION, AIR CONDITIONING (HVAC)

- a. Install smoke detectors, dampers, doors, and other equipment in accordance with NFPA 72, 90A, UFC 4-010-01, UFC 4-021-01, UFC 3-410-01FA and manufacturer recommendations and specifications and all other applicable codes and or standards except as modified herein.
- b. Install smoke detectors listed for use in air distribution systems shall be located as follows:
 1. Downstream of the air filters and ahead of any branch connections in air supply systems having a capacity equal to or greater than 2000-CFM's.
 2. Prior to the connection to a common return and prior to any recirculation or fresh air inlet connection in air systems having a capacity equal to or greater than 15,000-CFM's.



FH PROJECT SPECIFIC REQUIREMENTS

3. At each story prior to the connection to a common return and prior to any recirculation or fresh air inlet connection in air systems having a capacity equal to or greater than 15,000-CFM's and serving more than one story.
 4. Duct smoke detectors shall be furnished by the contractor.
- c. Hardwire all duct smoke detectors to the air handler unit that the duct detector is monitoring.
- d. Where duct smoke detectors are installed in concealed locations, more than 10-feet above the finish floor or in arrangement where the detector's alarm or supervisory indicator is not visible to responding personnel, provide the detector with remote indicator and test switch in location acceptable to AHJ
- e. Shut down all HVAC units on any fire alarm utilizing the hardwired duct smoke detector and the HVAC computer program.
- f. Shut down all HVAC units on any fire alarm or required manual shut down, regardless of size; and/or distributes outside air within a facility.
- g. "Emergency HVAC Shut Down" Switch
1. Shut down all HVAC units that distributes outside air or just move air within a facility when "Emergency HVAC Shut Down" switch is activated.
 2. When an "Emergency HVAC Shut Down" switch is activated, HVAC shut down shall be accomplished through the fire alarm panel program; changing the state of a programmable relay connected to each individual air handler unit that shall shut down each air handler unit until "Emergency HVAC Shut Down" switch is returned to its normal position.
 3. "Emergency HVAC Shut Down switch shall be located inside the ACU and inside every LOC regardless of LOC location.
 4. When a separate "Emergency HVAC Shut Down" switch located outside of ACU or LOC, it shall not delete the requirement of having an "Emergency HVAC Shut Down" switch within the ACU or each LOC.
 5. A programmable relay shall be installed at each air handler unit to shut down each air handler unit when required during a fire event or when "Emergency HVAC Shut Down" switches is activated.
 6. Provide all outside air intakes, relief air and exhaust openings with low leakage damper that are automatically closed when an Emergency HVAC Shut Down switch is activated.



FH PROJECT SPECIFIC REQUIREMENTS



7. Provide a programmable relay for each low leakage damper that shall cause low leakage damper to automatically close when Emergency HVAC Shut Down switch is activated.
8. Provide a programmable relay to shut down each air handler unit associated with each low leakage damper when low leakage dampers are required to close.
9. Close all required dampers in accordance with UFC 4-010-01 when “Emergency HVAC Shut Down” switch is activated.

15. EMERGENCY LIGHTING

- a. Install emergency lighting in accordance with NFPA 101, UFC 3-600-01, and all applicable codes except as modified herein.
- b. Provide emergency lighting in all windowless locations to include but not limited to restrooms, mechanical rooms, and elevator machine rooms.
- c. Provide exterior emergency/egress lighting, with backup power to illuminate the pathway to public way.
- d. Install emergency lighting in all facilities regardless of occupancy.

16. EXIT SIGNAGE (Means of Egress)

- a. Provide electric Exit signs and Directional signs in accordance with NFPA 101, UFC 3-600-01, and all applicable codes and standards except as modified herein.
- b. Install Exit signs at main exterior exit doors that are readily visible from any direction of exit access.
- c. Install Exit signs at all exit access and exterior doors leading to public way.
- d. Provide Directional signs showing the direction of travel to nearest exit where the direction of travel to reach the main exit is not apparent.

17. DOORS

- a. Doors and self-closure appliances shall comply with NFPA 101, NFPA 80, UFC 3-600-01, and applicable codes and standards



FH PROJECT SPECIFIC REQUIREMENTS



18. LIFE SAFETY PLAN

- a. Provide Life Safety Plan to scale to include:
 1. Primary and Alternate means of egress
 2. Location of assembly/rally points

19. FIRE PREVENTION AND INSPECTION CONTACT INFORMATION

E-mail address: keith.a.read@mail.mil

Telephone: 520-533-1887

foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area must be graded, filled and the entire area seeded unless otherwise indicated.

3.18 SITE WORK FOR UNEXPLODED ORDNANCE SITE

This Site was a previous Unexploded Ordnance area. The site has been cleared, but the contractor must comply with EM-385-1-97 Safety-Explosives SAFETY AND HEALTH REQUIREMENTS MANUAL, EM 200-1-15 Technical Guidance for Military Munitions Response Actions and Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities. This MAY require the Contractor to provide UXO personnel monitors during any site work excavation.

3.19 FT HUACHUCA REQUIRMENTS

The Contractor shall be responsible for complying with all Federal, State, and Local environmental regulations included as part of the processes in performing the work included in this Task Order. Do not dispose of any regulated waste generated during this project in the trash or dumpster. It is the Contractor's responsibility to dispose of all ACM waste at a commercial, permitted disposal facility. Please schedule an appointment with the Regulated Waste Office, Building 90404, to discuss the handling of regulated waste on this project.

Quarterly Waste Diversion reports are required.

Compile and report the following information to the COR for the DPW ENRD Air Quality Program:

Prior to installation and start-up of new mechanical equipment, provide the following for each new HVAC unit being installed: Make, model, serial, date of manufacture, refrigerant type, refrigerant charge per circuit and line charge, natural gas/propane input, exhaust stack height and diameter, location description and final installation and start-up dates. Provide copies of spec sheets for all new HVAC equipment. New equipment shall not contain ozone depleting substances (ODS) and greenhouse gas global warming potential (GWP) of new refrigerant must be lower than existing equipment.

If new mechanical equipment fires natural gas, propane or other fuel and has a maximum input of 0.5 million Btu or greater, provide the above-requested information for permitting review at least 45 days prior to purchasing the equipment.

Refrigerant-containing equipment must be repaired, modified, removed and/or installed by personnel certified in accordance with 40 CFR 82, as applicable. Provide copies of installing contractor's technician certifications to the DPW ENRD Air Quality Program. Provide the following information for all HVAC equipment being removed and/or disposed: Make, model, serial (or equipment description if this information is not available) and removal date. Refrigerant-containing equipment must be properly purged of refrigerant and disposed of in accordance with 40 CFR 82, as applicable; provide copy of all purge and disposal records for DPW ENRD Air Quality Program records through the COR. If equipment will be retained for future use, please indicate as such in the records that are provided to the DPW ENRD Air Quality Program.

For appliances that will be removed from Fort Huachuca by the installing/removal contractor: All Class I and Class II refrigerant must



NO.	DATE	DESCRIPTION
1	10/16/2020	DOOR AND SIGNAGE REVISION; REFERENCE CLARIFICATIONS
2	10/17/2020	1. CLARIFICATIONS ON BID SET

Project No.	2145
Spec No.	228-25-0665
File Name	WB6A_GTEB
Submitted Status	RYA
Reviewed By	ACAJUNO
Checked By	SA/ Matthew Valentin
Chief, Architectural Design Section	

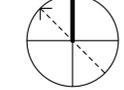
US ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
3425 J STREET
SACRAMENTO, CA 95814

FT. HUACHUCA
GROUND TRANSPORT
EQUIPMENT BUILDING
GTEB FLOOR PLAN - AREA 'B'

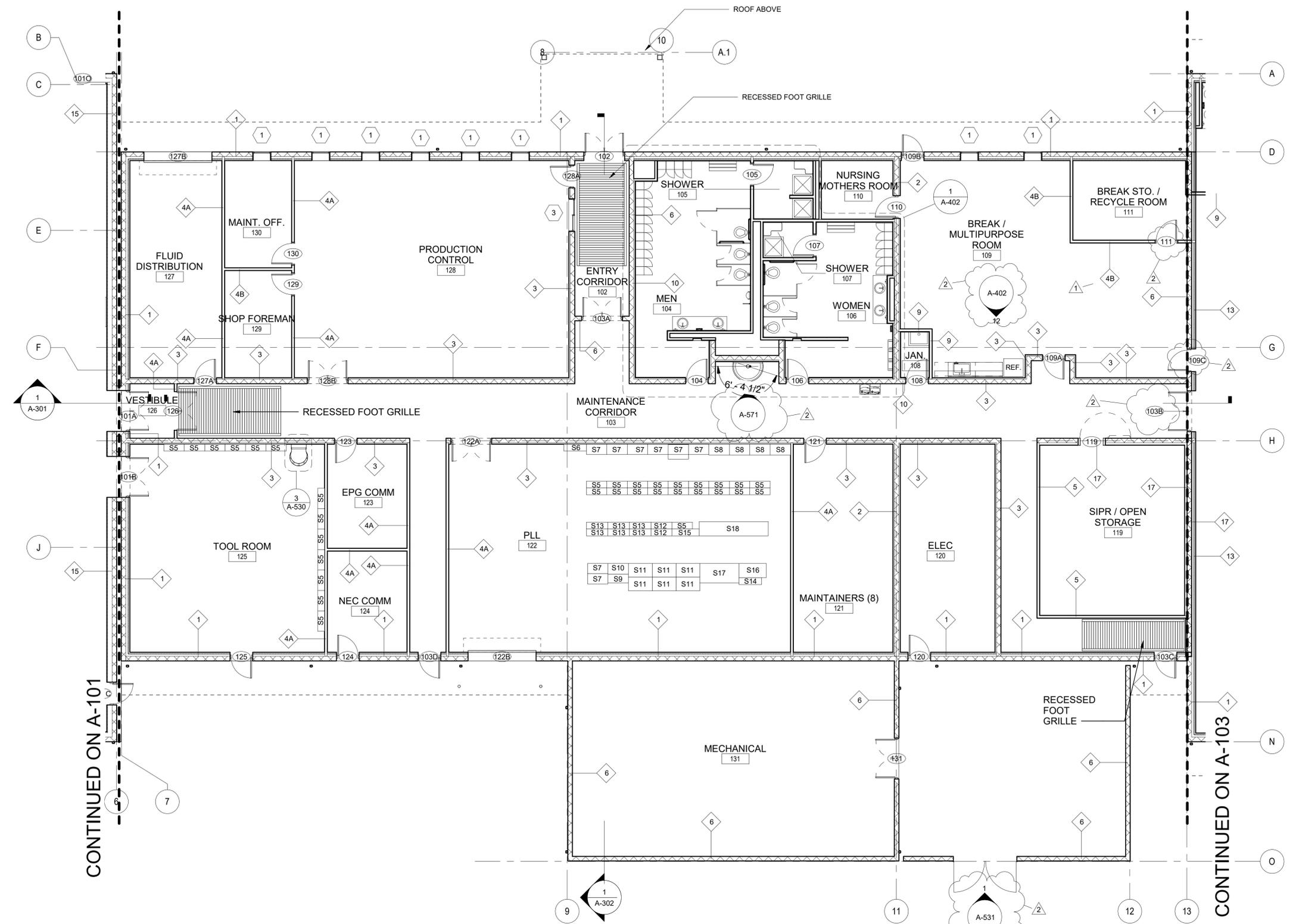
SHEET
IDENTIFICATION
A-102

AREA
'B'

PLAN NORTH



SCALE: 1/8"=1'-0"



- SHELVING NOTES:
- S5 SHELVES (36" X 12")
 - S6 SHELVES (34" X 12")
 - S7 SHELVES (36" X 18")
 - S8 SHELVES (36" X 19")
 - S9 SHELVES (36" X 15")
 - S10 SHELVES (36" X 18.5")
 - S11 SHELVES (36" X 24")
 - S12 SHELVES (37" X 12")
 - S13 SHELVES (38" X 12")
 - S14 SHELVES (40" X 12")
 - S15 SHELVES (48" X 12")
 - S16 SHELVES (48" X 24.5")
 - S17 SHELVES (69" X 34")
 - S18 SHELVES (121" X 24.5")

NOTE: CONFIRM FINAL LOCATIONS OF SHELVING UNITS WITH CUSTOMER AND COR.

1
A-102
GTEB FIRST FLOOR PLAN - AREA B
1/8" = 1'-0"

AMENDMENT 3



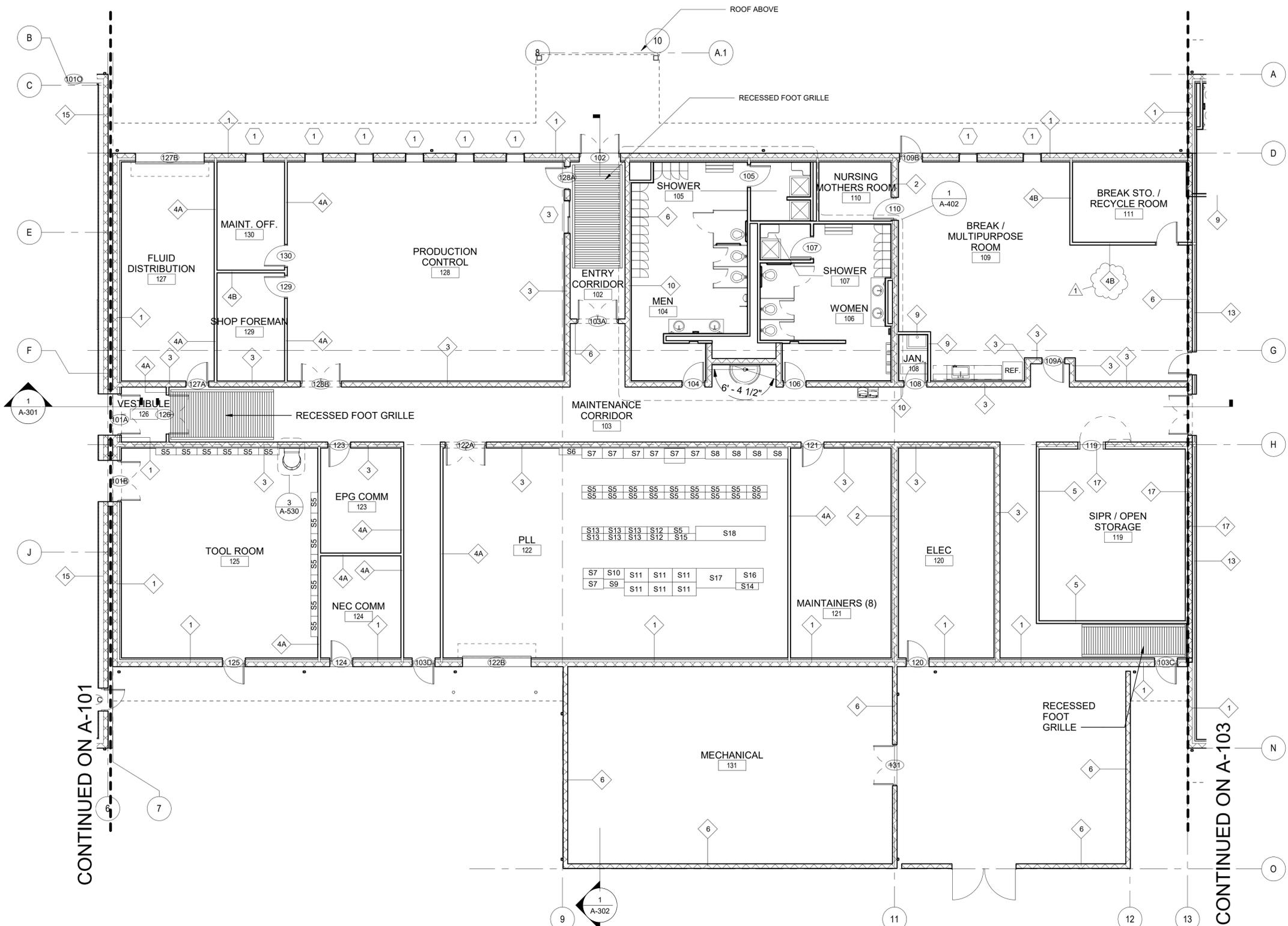
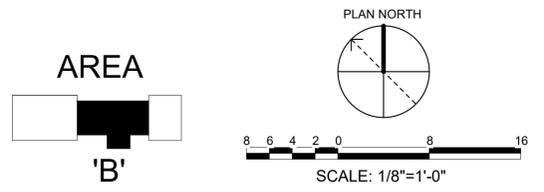
NO.	DATE	DESCRIPTION
1	10/7/2020	Clarifications on bid set

Project No.	2145
Spec No.	228-25-0665
File Name	WB6A_GTEB
Submitted Status	RYA
Reviewed By	ACAJUNO
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US ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
3425 J STREET
SACRAMENTO, CA 95814

FT. HUACHUCA
GROUND TRANSPORT
EQUIPMENT BUILDING
GTEB FLOOR PLAN - AREA
'B'

SHEET IDENTIFICATION
N
A-102A



- SHELVING NOTES:
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NOTE: CONFIRM FINAL LOCATIONS OF SHELVING UNITS WITH CUSTOMER AND COR.

1 A-102 1/8" = 1'-0" GTEB FIRST FLOOR PLAN - AREA B

AMENDMENT 3

CONTINUED ON A-101

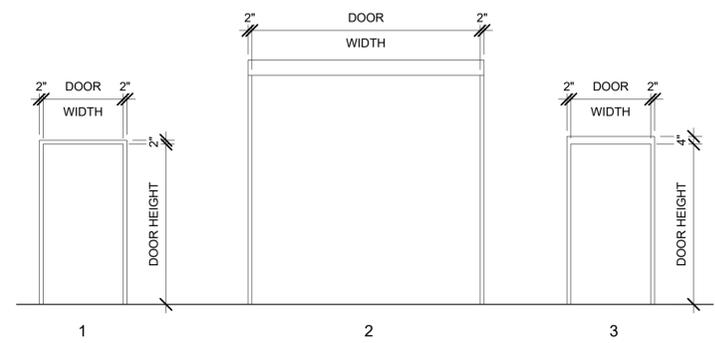
CONTINUED ON A-103

BUILDING DOOR SCHEDULE

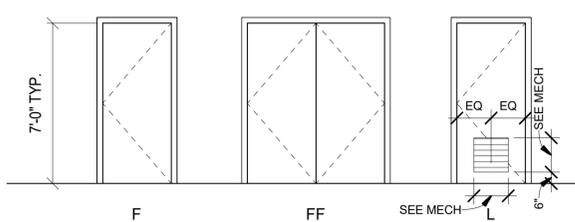
DOOR NO.	HW	TYPE	DOOR					FIRE RATING	FRAME			DETAILS			COMMENTS
			SIZE		THK	MATL	FIN		TYPE	MATL	FIN	HEAD	JAMB	SILL	
WIDTH	HT	WIDTH	HT	THK				MATL							FIN
101A	HW-1	FF	5'-8"	7'-0"	2"	HM	PT	3/4 HR	3	HM	PT	1/A-521	1/A-521	13/A-520	INSULATED DOOR
101B	HW-1	FF	5'-8"	7'-0"	2"	HM	PT	3/4 HR	3	HM	PT	1/A-521	1/A-521	13/A-520	INSULATED DOOR
101C	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
101D	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101E	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101F	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101G	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101H	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
101J	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
101K	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101L	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101M	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101N	HW-3	OH	24'-0"	20'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
101O	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
102	HW-4	FF	5'-8"	7'-0"	2"	STL	PT		3	STL	PT	1/A-521	1/A-521	7/A-520	INSULATED DOOR
103A	HW-5	FF	5'-8"	7'-0"	2"	HM	PT		3	HM	PT	4/A-521	4/A-521	--	
103B	HW-1 OR HW-4	FF	5'-8"	7'-0"	2"	STL	PT	3/4 HR	2	STL	PT	1/A-521 OR SIM	1/A-521 OR SIM	2/A-520 OR 4/A-520	FIRST OPTION OMITTED IF OPTION 3 NOT AWARDED
103C	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	7/A-520	INSULATED DOOR
103D	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
104	HW-6	L	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	5/A-521	5/A-521	3/A-520	
105	HW-8	F	3'-0"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	5/A-520	
106	HW-6	L	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	5/A-521	5/A-521	3/A-520	
107	HW-7	F	3'-0"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	5/A-520	
108	HW-10	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	2/A-521	2/A-521	3/A-520	1" UNDERCUT
109A	HW-11	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	2/A-521	2/A-521	6/A-520	
109B	HW-2	F	3'-0"	7'-0"	2"	STL	PT		3	STL	PT	1/A-521	1/A-521	12/A-520	INSULATED DOOR
109C	HW-21 OR HW-2	F	3'-0"	7'-0"	2"	STL	PT		3	STL	PT	1/A-521 OR SIM	1/A-521 OR SIM	2/A-520 OR 4/A-520	FIRST OPTION OMITTED IF OPTION 3 NOT AWARDED
110	HW-9	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	2/A-521	2/A-521	11/A-520	
111	HW-12	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	3/A-521	3/A-521	11/A-520	
114A	HW-4	FF	5'-8"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	14/A-520	INSULATED DOOR, OPTION ITEM 3
114B	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	14/A-520	INSULATED DOOR, OPTION ITEM 3
114C	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	14/A-520	INSULATED DOOR, OPTION ITEM 3
115	HW-6	L	3'-0"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	1/A-520	OPTION ITEM 3
116	HW-6	L	3'-0"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	1/A-520	OPTION ITEM 3
117	HW-13	FF	5'-8"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	9/A-520	OPTION ITEM 3
119	HW-14	V	3'-4"	6'-6"	4 1/2"	STL	PT		3	STL	PT	11/A-521	10/A-521	9/A-521	
120	HW-16	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
121	HW-17	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	2/A-521	2/A-521	6/A-520	
122A	HW-18	FF	5'-8"	7'-0"	2"	HM	PT		3	HM	PT	2/A-521	2/A-521	--	
122B	HW-3	OH	10'-0"	10'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
123	HW-21	F	3'-0"	7'-0"	2"	HM	PT	1-3/4 HR	3	HM	PT	2/A-521	2/A-521	13/A-520	
124	HW-22	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
125	HW-2	F	3'-0"	7'-0"	2"	HM	PT		3	HM	PT	1/A-521	1/A-521	4/A-520	INSULATED DOOR
126	HW-19	FF	5'-8"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	8/A-520	
127A	HW-21	F	3'-0"	7'-0"	2"	HM	PT	3/4 HR	1	HM	PT	2/A-521	2/A-521	8/A-520	
127B	HW-3	OH	10'-0"	10'-0"	2"	STL	PT		2	STL	PT	7/A-521	6/A-521	10/A-520	INSULATED DOOR
128A	HW-17	F	3'-0"	7'-0"	2"	HM	PT		1	HM	PT	2/A-521	2/A-521	8/A-520	
128B	HW-18	FF	5'-8"	7'-0"	2"	HM	PT		3	HM	PT	2/A-521	2/A-521	6/A-520	
129	HW-20	F	3'-0"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	11/A-520	
130	HW-20	F	3'-0"	7'-0"	2"	HM	PT		1	HM	PT	3/A-521	3/A-521	11/A-520	
131	HW-15	FF	5'-8"	7'-0"	2"	STL	PT		3	STL	PT	4/A-521	4/A-521	4/A-520	

ABBREVIATIONS

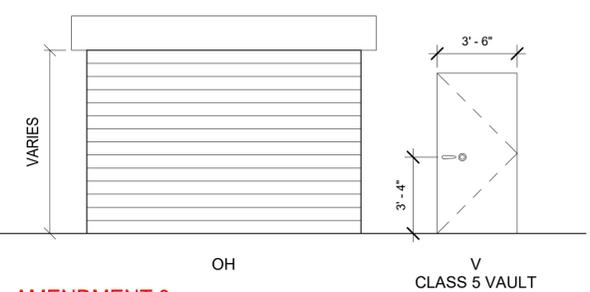
AL	ALUMINUM
AN	ANODIZED
ALUM	ALUMINUM
DR	DOOR
FIN	FINISH
HM	HOLLOW METAL
HR	HOUR
HW	HARDWARE
MATL	MATERIAL
NO.	NUMBER
PT	PAINT
PR	PAIR
WD	WOOD
ST	STAIN
STL	STEEL



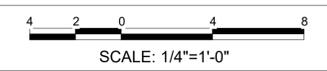
DOOR FRAME TYPES
1/4" = 1'-0"



DOOR TYPES
1/4" = 1'-0"



AMENDMENT 3



SCALE: 1/4"=1'-0"



Project No.	2145
Spec No.	2145
File No.	228-25-0665
File Name	WB6A_GTEB
Scale	1/4" = 1'-0"
Print Date	10/16/2020 4:08:39 PM

Submitted By	MVALENTINE, NIZY
Reviewed By	ACAJUNO
Checked By	ACAJUNO
Chief, Architectural Design Section	(s) Matthew Valentin

US ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
3045 J STREET
SACRAMENTO, CA 95814

FT. HUACHUCA
GROUND TRANSPORT EQUIPMENT BUILDING
DOOR SCHEDULE - GTEB

SHEET IDENTIFICATION
A-620

C

B

A

SIGN SCHEDULE-PROJECT									
LOCATION	LOCATION TYPE		SIGN TYPE	PLACEMENT DETAIL	MOUNTING DETAIL	COPY			COMMENTS
	DOOR	WALL				LINE 1*	LINE 2**	LINE 3***	
101A		X	1	3/A-540	4/A-540				
101B		X	1	3/A-540	4/A-540				
103B		X	3	3/A-540	4/A-540				
104	X		7	1/A-540	2/A-540				
105		X	9	5/A-540	6/A-541				
106	X		8	1/A-540	2/A-540				
107		X	9	5/A-540	6/A-541				
108		X	1	3/A-540	4/A-540				
109A		X	1	3/A-540	4/A-540				
110		X	3	3/A-540	4/A-540				
112B		X	1	3/A-540	4/A-540				
112C		X	3	3/A-540	4/A-540				
115	X		8	3/A-540	4/A-540				OPTION ITEM 3
116	X		7	3/A-540	4/A-540				OPTION ITEM 3
117		X	1	3/A-540	4/A-540				OPTION ITEM 3
119		X	1	3/A-540	4/A-540				
120		X	1	3/A-540	6/A-541				
121		X	1	3/A-540	4/A-540				
122A		X	1	3/A-540	4/A-540				
123		X	1	3/A-540	4/A-540				
124		X	1	3/A-540	6/A-541				
127A		X	1	3/A-540	4/A-540				
128A		X	1	3/A-540	4/A-540				
128B		X	1	3/A-540	4/A-540				
129		X	1	3/A-540	4/A-540				
130		X	1	3/A-540	4/A-540				
131		X	1	3/A-540	6/A-541				

GENERAL NOTES:

- UNLESS OTHERWISE NOTED, SIGNS ARE LOCATED BY DOOR NUMBER. "LOCATION TYPE" REFERS TO LOCATION WITHIN ROOM. "DOOR" INDICATES SIGNAGE MOUNTED ON THE LISTED DOOR. "WALL" INDICATES SIGNAGE MOUNTED ADJACENT TO THE LISTED DOOR. SEE SCHEDULE NOTE BELOW FOR ADDITIONAL CLARIFYING NOTES.
- SEE SHEETS A-540 AND A-541 FOR SIGN TYPES REFERENCED.
- MANUFACTURER'S AND PRODUCT LISTED ARE FOR IDENTIFICATION PURPOSES ONLY AND ARE NOT INTENDED TO LIMIT SELECTIONS TO THOSE PRODUCTS INDICATED. AN EXACT MATCH TO THE MANUFACTURER'S COLOR OR PRODUCT IS NOT REQUIRED. THE SELECTIONS SERVE ONLY TO INDICATE THE COLOR WHICH THE CHOSEN MANUFACTURER'S STANDARD MUST APPROACH. FINAL SELECTION SHALL BE APPROVED BY THE CONTRACTING OFFICER.
- SEE LIFE SAFETY PLAN SHEETS F-101 FOR SIGN TYPE 4 (FIRE EXTINGUISHER SIGNS) LOCATIONS AND EGRESS SIGNS.
- SIGNS BASED ON ASI SIGNAGE INNOVATIONS "INFORM" PRODUCT. SEE MANUFACTURER INFORMATION THIS SHEET.
- COORDINATE FINAL SIGN LOCATION WITH CONTRACTING OFFICER.
- ALL FEC'S SHALL HAVE INDICATION SIGNS HUNG DIRECTLY ABOVE THEM.
- ALL SIGNAGE SHALL HAVE A CLASS S FIRE RATING.
- PROVIDE 1 EA. SIGN TYPE E1 PER BLDG. MOUNTED PER 3/A-540 & 6/A-541.

MANUFACTURER INFORMATION:
 PRODUCT LINE: INFORM
 MATERIAL: THERMOFORMED ACRYLIC & OVC ALLOY
 PLAQUE THICKNESS: 1/4 INCH
 SURFACE TEXTURE: MATTE (NON-GLARE)
 MATERIAL COLOR: DARK BROWN
 TACTILE LETTERING COLOR: WHITE
 BEVEL OPTION: BULLNOSE

- SCHEDULE NOTE:
- * ROOM NUMBERS SHALL BE PROVIDED
 - ** SEE FINISH SCHEDULE FOR ROOM NAME
 - *** CONTRACTOR SHALL COORDINATE WITH CONTRACTING OFFICER FOR ROOM OCCUPANT'S NAME TITLE ON SIGNAGE
 - SIGNS SHALL HAVE "IN USE" SIGNS FOR ROOM TO INDICATE OCCUPANCY
 - MOUNT SIGN TO NEAREST AVAILABLE WALL, 6" FROM WALL EDGE

AMENDMENT 3



NO.	DATE	DESCRIPTION
2	10/16/2020	DOOR AND SIGNAGE REVISION, REFERENCE CLARIFICATIONS

DESIGNED BY: MVALENTINE CBA SUBMITTED STATUS: RFA REVIEWED BY: A. J. LINO DRAWN BY: M. VALENTINE CHECKED BY: M. VALENTINE PROJECT NO.: 2145 FILE NO.: 228-25-0665 SHEET NO.: 34 PROJECT DATE: 10/16/2020 4:08:59 PM	US ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT 95829 STREET SACRAMENTO, CA 95814
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AZ
 FT. HUACHUCA
 GROUND TRANSPORT EQUIPMENT BUILDING
 SIGN SCHEDULE

SHEET IDENTIFICATION
 A-640

C

B

A

SIGN SCHEDULE-PROJECT									
LOCATION	LOCATION TYPE		SIGN TYPE	PLACEMENT DETAIL	MOUNTING DETAIL	COPY			COMMENTS
	DOOR	WALL				LINE 1*	LINE 2**	LINE 3***	
301B	X		2	1/A-540	2/A-540				OPTION 8
301D	X		2	1/A-540	2/A-540				OPTION 8
301F	X		2	1/A-540	2/A-540				OPTION 8
302	X		2	1/A-540	2/A-540				OPTION 8
303	X		2	1/A-540	2/A-540				OPTION 8
304	X		2	1/A-540	2/A-540				OPTION 8
401A	X		2	1/A-540	2/A-540				OPTION 6 (POL), OPTION 7 (HAZMAT)
TIRE YARD FENCE		X	E2, 11	3/A-540	7/A-540				OPTION 8, MOUNT BOTH SIGNS TO FENCE AS INDICATED ON A-540

GENERAL NOTES:

- UNLESS OTHERWISE NOTED, SIGNS ARE LOCATED BY DOOR NUMBER. "LOCATION TYPE" REFERS TO LOCATION WITHIN ROOM. "DOOR" INDICATES SIGNAGE MOUNTED ON THE LISTED DOOR. "WALL" INDICATES SIGNAGE MOUNTED ADJACENT TO THE LISTED DOOR. SEE SCHEDULE NOTE BELOW FOR ADDITIONAL CLARIFYING NOTES.
- SEE SHEETS A-540 AND A-541 FOR SIGN TYPES REFERENCED.
- MANUFACTURER'S AND PRODUCT LISTED ARE FOR IDENTIFICATION PURPOSES ONLY AND ARE NOT INTENDED TO LIMIT SELECTIONS TO THOSE PRODUCTS INDICATED. AN EXACT MATCH TO THE MANUFACTURER'S COLOR OR PRODUCT IS NOT REQUIRED. THE SELECTIONS SERVE ONLY TO INDICATE THE COLOR WHICH THE CHOSEN MANUFACTURER'S STANDARD MUST APPROACH. FINAL SELECTION SHALL BE APPROVED BY THE CONTRACTING OFFICER.
- SEE LIFE SAFETY PLAN SHEETS F-101 FOR SIGN TYPE 4 (FIRE EXTINGUISHER SIGNS) LOCATIONS AND EGRESS SIGNS.
- SIGNS BASED ON ASI SIGNAGE INNOVATIONS "INFORM" PRODUCT. SEE MANUFACTURER INFORMATION THIS SHEET.
- COORDINATE FINAL SIGN LOCATION WITH CONTRACTING OFFICER.
- ALL FEC'S SHALL HAVE INDICATION SIGNS HUNG DIRECTLY ABOVE THEM.
- ALL SIGNAGE SHALL HAVE A CLASS S FIRE RATING.
- PROVIDE 1 EA. SIGN TYPE E1 PER BLDG, MOUNTED PER 3/A-540 & 6/A-541.

MANUFACTURER INFORMATION:
 PRODUCT LINE: INFORM
 MATERIAL: THERMOFORMED ACRYLIC & OVC ALLOY
 PLAQUE THICKNESS: 1/4 INCH
 SURFACE TEXTURE: MATTE (NON-GLARE)
 MATERIAL COLOR: DARK BROWN
 TACTILE LETTERING COLOR: WHITE
 BEVEL OPTION: BULLNOSE

- SCHEDULE NOTE:
- * ROOM NUMBERS SHALL BE PROVIDED
 - ** SEE FINISH SCHEDULE FOR ROOM NAME
 - *** CONTRACTOR SHALL COORDINATE WITH CONTRACTING OFFICER FOR ROOM OCCUPANT'S NAME TITLE ON SIGNAGE
 - SIGNS SHALL HAVE "IN USE" SIGNS FOR ROOM TO INDICATE OCCUPANCY
 - MOUNT SIGN TO NEAREST AVAILABLE WALL, 6" FROM WALL EDGE

AMENDMENT 3



18 OCT 2020	DATE
2	DOOR AND SIGNAGE REVISION, REFERENCE CLARIFICATIONS
	DESCRIPTION

US ARMY CORPS OF ENGINEERS	DESIGNED BY: MAVALENTINE OCA	DATE: 13 JUL 2020	PROJECT NO: 2145	FILE NO: 228-25-0665	FILE NAME: SACR-271-34
	Submitted Status: 100% SUBMITTAL				
	Reviewed by: ALOJUNO				
	Checked by: Matthew Valentin				
	Chief, Architectural Design Section				
					Print Date: 10/15/2020 4:07:38 PM

AZ
 FT. HUACHUCA
 GROUND TRANSPORT EQUIPMENT BUILDING
 SIGN SCHEDULE

SHEET IDENTIFICATION
 A-641

HOT WATER BOILER SCHEDULE

Table with columns: MARK, LOCATION (ROOM), TYPE, FUEL TYPE, MAX INPUT (MBH), MIN OUTPUT (MBH), RATED EFFICIENCY (%), GPM, EWT (°F), LWT (°F), MAX P.D. (FT H2O), MIN GPM, AIR INTAKE DIA. (IN), VENT DIA. (IN), ELECTRICAL, NOTES. Rows include B-1 and B-1*.

- 1. PROVIDE WITH CONDENSATE NEUTRALIZING FILTER KIT ROUTED TO NEARBY FLOOR SINK.
2. SIZE INTAKE AND VENT DIAMETERS BASED ON CHOSEN MANUFACTURER'S WRITTEN RECOMMENDATIONS.
3. MINIMUM OUTPUT SHOWN ASSUMES BOILER MUST BE DE-RATED 2% PER 1,000 FT ABOVE SEA LEVEL. PROJECT ELEVATION = 4,900 FT.
4. PROVIDE UNIT IF OPTION 3 IS NOT EXERCISED.
5. PROVIDE UNIT IF OPTION 3 IS EXERCISED.

NOTE: UNITS DESIGNATED WITH (*) SHALL BE PROVIDED IN PLACE OF COUNTERPART IF OPTION 3 IS NOT EXERCISED.

VAV TERMINAL UNIT SCHEDULE

Table with columns: MARK, AIRFLOW (COOLING, HEATING, MAX AIR PRESSURE DROP, INLET SIZE), REHEAT COIL (MIN COIL CAPACITY, ENTERING AIR TEMP, LEAVING AIR TEMP, GPM, MAX WATER PRESSURE DROP, EWT), CONTROL VALVE, VALVE CV, NOTES. Rows include ATU-101 through ATU-112.

- 1. PROVIDE UNIT IF OPTION 3 IS EXERCISED.

AIR-COOLED CHILLER SCHEDULE

Table with columns: MARK, LOCATION, MIN CAPACITY (TONS), MIN IPLV (EER), EVAPORATOR DATA (GPM, EWT, LWT, MAX P.D., MIN GPM, % GLYCOL), CONDENSER DATA (AMBIENT TEMP, FAN QTY, REFRIGERANT TYPE), COMPRESSOR TYPE, COMPRESSOR QTY, MAX POWER (KW), ELECTRICAL, WEIGHT (LBS), NOTES. Rows include CH-1 and CH-1*.

- 1. MINIMUM CAPACITY SHOWN IS REQUIRED AFTER TAKING INTO ACCOUNT PERFORMANCE AT 4,900 FT ELEVATION. SELECT UNIT THAT CAN MEET OUTPUT BASED ON MANUFACTURER'S RECOMMENDATIONS FOR ELEVATION LOSSES.
2. PROVIDE UNIT IF OPTION 3 IS NOT EXERCISED.
3. PROVIDE UNIT IF OPTION 3 IS EXERCISED.

HYDRONIC WATER PUMP SCHEDULE

Table with columns: MARK, TYPE, SERVICE, GPM, HEAD (FT H2O), PROPYLENE GLYCOL (%), MOTOR (RPM, HP, ELECTRICAL), MIN. EFFICIENCY, VFD / ECM, NOTES. Rows include BP-1, BP-1*, HWP-1, HWP-1*, HWP-2, HWP-2*, CWP-1, CWP-1*, CWP-2, CWP-2*.

- 1. PROVIDE UNIT IF OPTION 3 IS EXERCISED.

AIR SEPARATOR SCHEDULE

Table with columns: MARK, LOCATION (ROOM), GPM, MAX. WATER PRESSURE DROP (FT WC), SERVICE, NOTES. Rows include AST-1, AST-1*, AST-2, AST-2*.

- 1. PROVIDE UNIT IF OPTION 3 IS EXERCISED.

CHILLED WATER BUFFER TANK SCHEDULE

Table with columns: MARK, LOCATION, CAPACITY (GAL), TYPE, SYSTEM, NOTES. Row includes BT-1.

- 1. ASME STAMPED, 125 PSI RATED WORKING PRESSURE.

HYDRONIC EXPANSION TANK SCHEDULE

Table with columns: MARK, LOCATION (ROOM), SERVICE, TYPE, MIN VOLUME (GAL), MIN ACCEPT. VOLUME (GAL), CHARGE PRESSURE (PSI), MAX OPERATING TEMP (°F), MAX OPERATING PRESSURE (PSI), NOTES. Rows include ET-1 and ET-2.

AMENDMENT 3



US Army Corps of Engineers

Vertical table with columns: MARK, DESCRIPTION, DATE. Includes project details like Project No., Spec No., File No., File Name, Scale, and Date.

Vertical table with columns: DESIGNED BY, CHECKED BY, SUBMITTED BY, REVIEWED BY, APPROVED BY, DATE. Includes names like J. Stone and J. Stone.

FT. HUACHUCA GROUND TRANSPORT EQUIPMENT BUILDING HVAC SCHEDULES

SHEET IDENTIFICATION M-602



DATE	07 OCT 2020
DESCRIPTION	
MARK	2

DESIGNED BY:	D. CARULLI	ISSUE DATE:	07 OCT 2020
DRAWN BY:	D. CARULLI	PROJECT #	67223-0065
CHECKED BY:	S. JONES	DATE	07 OCT 2020
SUBMITTED BY:	S. JONES	FILE NUMBER:	2145
SIZE:	1/8" JOHN R. PARRISH	ANSI/D 1656	GTEB Central

US ARMY CORPS OF ENGINEERS	ARIZONA
SACRAMENTO DISTRICT	GROUND TRANSPORT EQUIPMENT BUILDING
US DEPT OF ARMY	
SACRAMENTO DISTRICT	
IN-HOUSE DESIGN	
SACRAMENTO, CA 95814	

SHEET ID	E-001
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LIGHTING

	1' x 4' LUMINAIRE. LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE. BLACK TRIANGLE HALF-FILL INDICATES BATTERY BACK-UP.
	2' x 4' LUMINAIRE. LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE. BLACK TRIANGLE HALF-FILL INDICATES BATTERY BACK-UP.
	2' x 2' LUMINAIRE. LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE. BLACK TRIANGLE HALF-FILL INDICATES BATTERY BACK-UP.
	CANOPY MOUNTED LUMINAIRE (SURFACE). LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE.
	PENDANT MOUNTED LUMINAIRE. LETTER INDICATES TYPE PER THE FIXTURE SCHEDULE. BLACK TRIANGLE HALF-FILL INDICATES BATTERY BACK-UP.
	WALL MOUNTED LUMINAIRE. LETTER INDICATES TYPE PER FIXTURE SCHEDULE. BLACK TRIANGLE HALF-FILL INDICATES BATTERY BACK-UP.
	SURFACE OR RECESSED LUMINAIRE. DOWNLIGHT. LETTER INDICATES TYPE PER FIXTURE SCHEDULE.
	RECESSED LUMINAIRE, ADJUSTABLE GIMBAL. LETTER INDICATES TYPE PER FIXTURE SCHEDULE. ARROW INDICATES AIMING DIRECTION.
	EXIT SIGN WITH DIRECTIONAL ARROWS AS INDICATED. WALL MOUNTING. SHADED SIDE IS FACE WITH EXIT SIGN. ALL EXIT SIGNS SHALL HAVE INTEGRAL BATTERY BACKUP FOR EMERGENCY MODE OPERATION.
	20 AMP, 125 VOLT TOGGLE SWITCH MOUNTED 42" AFF.
	3-WAY, 20 AMP, 125 VOLT TOGGLE SWITCH MOUNTED 42" AFF.
	DIMMER SWITCH (MAY BE COMBINED WITH OCCUPANCY SENSOR SWITCH)
	WALL MOUNTED COMBINATION OCCUPANCY SENSOR / SWITCH.
	CEILING MOUNTED OCCUPANCY SENSOR. "PIR," "U," OR "DT" INDICATES PASSIVE INFRARED, ULTRASONIC, OR DUAL TECHNOLOGY, RESPECTIVELY.
	WALL MOUNTED OCCUPANCY SENSOR. "PIR," "U," OR "DT" INDICATES PASSIVE INFRARED, ULTRASONIC, OR DUAL TECHNOLOGY, RESPECTIVELY.
	DAYLIGHT SENSOR. MARKINGS INDICATE DIRECTION OF PHOTOSENSING ELEMENT. WHEN "DS" IS USED ON A LUMINAIRE, IT SHALL BE INTEGRAL WITH THE LUMINAIRE, LOCATED ON THE DIRECTION OF THE LABEL LIGHTING CONTROL SWITCH

POWER

LETTER DESIGNATIONS ON RECEPTACLES INDICATE DIFFERENT TYPES AS FOLLOWS:	GFCI GROUND FAULT CIRCUIT INTERRUPTER AC ABOVE COUNTER (SHALL HAVE GFCI UNO) WP WEATHER PROOF (SHALL ALSO HAVE GFCI) REF REFRIGERATOR PRNT PRINTER/COPIER
	FLUSH FLOOR MOUNTED NEMA 5-20 DUPLEX RECEPTACLE, UNO
	FLUSH FLOOR MOUNTED NEMA 5-20 QUAD RECEPTACLE, UNO
	NEMA 5-20 DUPLEX RECEPTACLE MOUNTED 18" AFF, UNO
	NEMA 5-20 QUADRUPLX RECEPTACLE MOUNTED 18" AFF, UNO SINGLE PHASE 2 POLE RECEPTACLE: - NEMA 6-30R, 240 V (SPLIT PHASE) FOR PRESSURE/STEAM WASHERS - NEMA 6-30R, 208 V, SINGLE PHASE (2 POLE) FOR BAY AREAS. - ELECTRIC VEHICLE CHARGING PEDESTAL, SAE J1772 PLUG, 208 V, SINGLE PHASE (2 POLE) - NEMA L14-30R, 208V, SINGLE PHASE (2 POLE) FOR COMM RACKS.
	NEMA 15-20R, 120 V
	3 PHASE, 5 WIRE, 208 V RECEPTACLE. NEMA L21-30R FOR BAY AREAS. MOUNT 24" AFF UNO.
	WELDING OUTLET, NEMA L6-50
	PLASMA CUTTER OUTLET, NEMA L6-50
	MOTOR SWITCH
	JUNCTION BOX OR EQUIPMENT BOX, SIZE VARIES
	MOTOR, SIZE AS SHOWN, OR PER MECHANICAL AND PLUMBING SCHEDULES.
	UNFUSED DISCONNECT SWITCH. WHEN ADJACENT TO MOTOR, COMBINED MOTOR STARTER/DISCONNECT
	FUSED DISCONNECT SWITCH. SIZE FUSES FOR EQUIPMENT BASED ON MANUFACTURERS RECOMMENDATIONS
	SURFACE MOUNTED PANELBOARD OR AUTOMATIC TRANSFER SWITCH, AS INDICATED
	RECESSED MOUNTED PANELBOARD

WIRING

	DOTTED TICK MARK IS GROUND, LONG TICK MARK IS NEUTRAL, SHORT TICK MARKS ARE NUMBER OF PHASE CONDUCTORS. ARROW INDICATES HOMERUN OR CONTINUATION OF CIRCUIT. HOMERUN WILL BE ANNOTATED WITH PANEL/CIRCUIT NUMBER.
	TYPICALLY, 20A AND 15 A CIRCUITS SHALL HAVE #12 PHASE CONDUCTORS, #12 GROUNDING CONDUCTOR, AND #12 GREEN EQUIPMENT GROUNDING CONDUCTOR IN 3/4" CONDUIT.
EXTERIOR SITE	
	UNDERGROUND PRIMARY ELECTRICAL LINE.
	UNDERGROUND SECONDARY ELECTRICAL LINE.
	EXISTING UNDERGROUND COMMUNICATION LINE
	EXISTING OVERHEAD COMMUNICATION LINE
	EXISTING ITEMS TO BE REMOVED
	NEW UNDERGROUND PRIMARY
	NEW UNDERGROUND SECONDARY
	NEW UNDERGROUND COMMUNICATIONS
	EXISTING SECTIONALIZER CABINET
	NEW PAD MOUNTED TRANSFORMER
	ELECTRICAL HANDHOLE. SEE E-510, PLATE UG6
	ELECTRICAL PULL BOX. SEE E-510, PLATES UG4 AND UG5
	ELECTRICAL MANHOLE
	COMMUNICATIONS MANHOLE, SEE E-511
	NEW POLE MOUNTED LIGHTING FIXTURE
	NEW BOLLARD LIGHT FIXTURE.
	ELECTRONIC DOOR LOCK WITH CARD READER AND KEYPAD, INTEGRAL WITH LATCH. SEE DETAIL 2/T-501.

COMMUNICATIONS / SECURITY

	3-PORT DATA/VOICE OUTLET - 2 DATA AND 1 VOICE, CAT 6, RJ45 UNO.
	DUAL (2-PORT) DATA OUTLET, CAT 6, RJ45 UNO.
	SINGLE-PORT TELEPHONE OUTLET, MOUNTED 48" AFF UNO.
	CATV COAX OUTLET, F-TYPE, MOUNTED 78" AFF.
	PUBLIC ADDRESS SYSTEM SPEAKER, RATED 15 W, MOUNTED 15" AFF UNO.
	PUBLIC ADDRESS CONTROL STATION. SEE DETAIL 2/T-502.
	ELECTRONIC DOOR LOCK WITH CARD READER AND KEYPAD, INTEGRAL WITH LATCH. SEE DETAIL 2/T-501.
	JUNCTION BOX OR EQUIPMENT BOX, SIZE VARIES.
	SECURITY CAMERA, STATIONARY, OUTDOOR RATED, TAMPER RESISTANT, MOUNTED 8" ABOVE GRADE UNO. LINES INDICATE APPROXIMATE FIELD OF VIEW.
	SECURITY CAMERA (SYSTEM DIAGRAM ONLY)
	TELEPHONE TERMINAL BACKBOARD (TTB), 8" TALL X 4" WIDE X 3/4" THICK PLYWOOD
	42U 19" EQUIPMENT RACK. DASHED LINES INDICATE DEDICATED SPACE FOR FUTURE RACKS

SINGLE LINE DIAGRAM

	CIRCUIT BREAKER
	FUSED DISCONNECT
	BREAKLINE
	TRANSFORMER
	UTILITY METER
	SURGE PROTECTIVE DEVICE
	MOTOR

ANNOTATIONS

	LUMINAIRE TAG. IF SHOWN, SECOND LINE IS SWITCH LABEL FOR LUMINAIRE (SEE BELOW). SEE LUMINAIRE SCHEDULE, SHEET E-501.
	SWITCH TAG. FIRST LETTER DESIGNATES ROOM/AREA. SECOND LETTER DESIGNATES SWITCH SYSTEM IN ROOM.
	MECHANICAL OR PLUMBING EQUIPMENT TAG. SEE HVAC EQUIPMENT SCHEDULES, SHEET M-601, OR PLUMBING EQUIPMENT SCHEDULES, SHEET P-601.
	CIRCUIT CALLOUT. FIRST PERENTHESES IS PANEL NAME, SECOND PERENTHESES IS CIRCUIT NUMBER IN THAT PANEL.
# symbol"/>	KEYNOTE OR EQUIPMENT CALLOUT. SEE KEYNOTE OR EQUIPMENT LEGEND ON RELEVANT SHEETS.

LINES AND CALLOUTS

	DEMOLISHED
	NEW
	(HALFTONE) UNAFFECTED, OR FEATURES FROM DIFFERENT DISCIPLINE
	VIEW CALLOUT, SEE SHEET A-001 FOR MORE DETAILS
	MATCHLINE

FIRE ALARM / MNS

	MANUAL PULL STATION, HANDLE MOUNTED AT 45" AFF.
	SMOKE DETECTOR, PHOTOELECTRIC TYPE. "ASD" DENOTES AIR SAMPLING DEVICE FOR HVAC DUCT.
	FIRE ALARM/MNS STROBE SPEAKER, (WALL MOUNTED, CEILING MOUNTED, RESPECTIVELY). MOUNT 7" AFF WHEN WALL MOUNTED. STROBE IS WHITE/CLEAR. STROBE SHALL READ "ALERT".
	FIRE ALARM SPEAKER, MOUNTED 7" AFF WHEN WALL MOUNTED.
	FIRE ALARM STROBE
	MNS LED TEXT DISPLAY
	ADDRESSABLE INPUT MODULE. TYPE AS INDICATED.

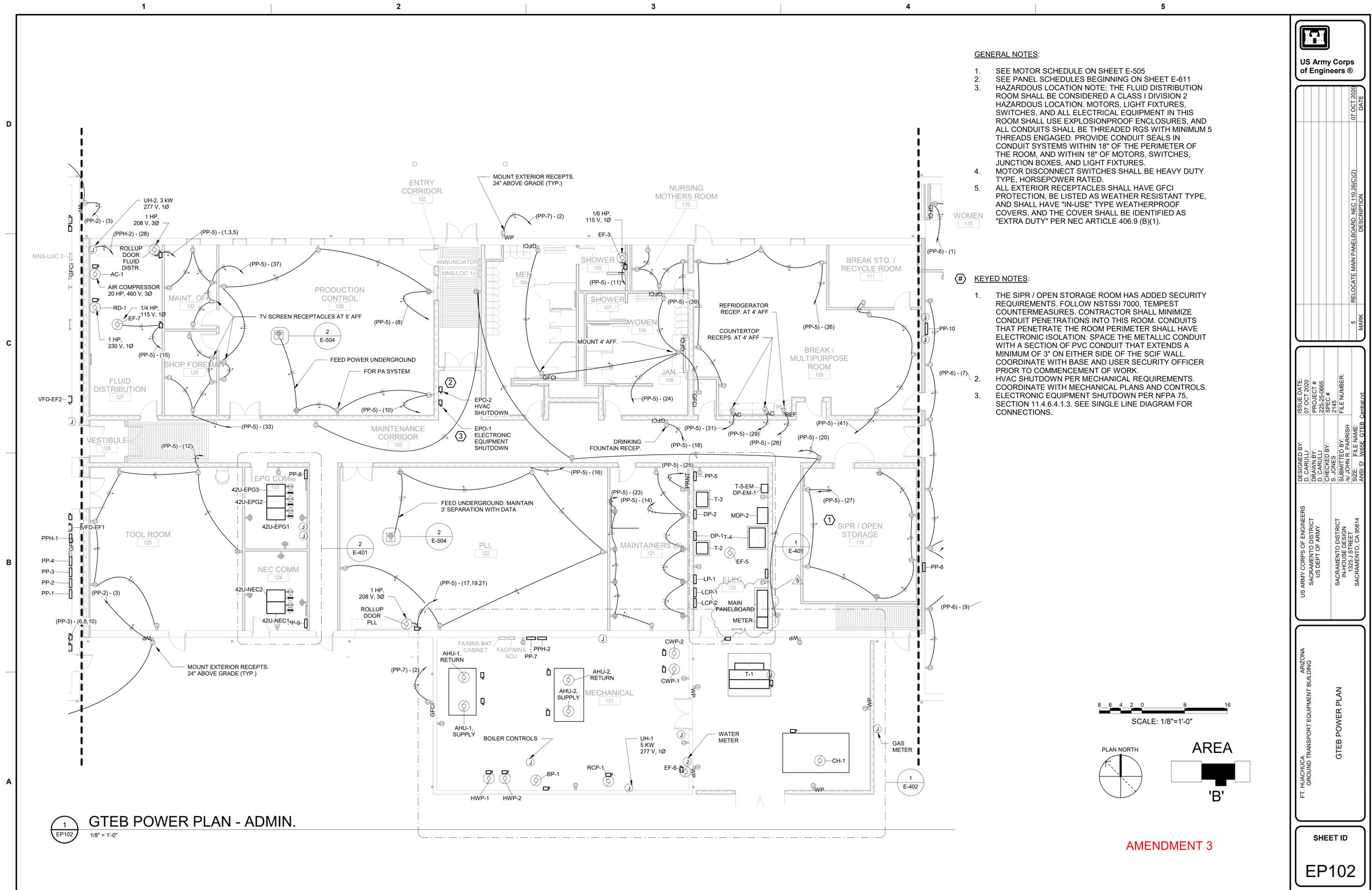
ABBREVIATIONS

A	AMPERE
AC	ABOVE COUNTER, 42" AFF UNLESS OTHERWISE INDICATED
ACS	ACCESS CONTROL SYSTEM
ACU	AUTONOMOUS CONTROL UNIT
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
AL	ALUMINUM
1/C	ONE CONDUCTOR
C	CONDUIT
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CU	COPPER
DS	DAYLIGHT SENSOR
DT	DUAL TECHNOLOGY (OCCUPANCY SENSOR)
DVR	DIGITAL VIDEO RECORDER
EF	EXHAUST FAN
EMT	ELECTRICAL METALLIC TUBING
EWC	ELECTRIC WATER COOLER
FACP	FIRE ALARM CONTROL PANEL
FM	FREQUENCY MODULATION
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND	GROUND
GTEB	GROUND TRANSPORT EQUIPMENT BUILDING
HACR	HEATING AIR CONDITIONING REFRIGERATION
HAZ	HAZARDOUS, AS IN HAZARDOUS MATERIALS STORAGE
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HT	HEIGHT
HZ	HERTZ
IDS	INTRUSION DETECTION SYSTEM
J	JUNCTION BOX
KWH	KILOWATT HOUR
LCP	LIGHTING CONTROL PANEL
LED	LIGHT EMITTING DIODE
LOC	LOCAL OPERATING CONSOLE
MCB	MOLDED CASE CIRCUIT BREAKER/MAIN CIRCUIT BREAKER
MH	METAL HALIDE
MLO	MAIN LUGS ONLY
MNS	MASS NOTIFICATION SYSTEM
MPPT	MAXIMUM POWER POINT TRACKING
MTD	MOUNTED
NEC	NATIONAL ELECTRICAL CODE
NEC	NETWORK ENTERPRISE CENTER
NF	NON FUSED
NO	NUMBER
NOCT	NOMINAL OPERATING CELL TEMPERATURE
OS	OCCUPANCY SENSOR
ORG	ORGANIZATION, AS IN ORG STORAGE BUILDING
PH	PHASE
PIR	PASSIVE INFRARED
POL	PETROLIUM OIL LUBRICANT, AS IN POL STORAGE BUILDING
PV	PHOTOVOLTAIC
RGS	RIGID GALVANIZED STEEL
SM	SINGLE MODE
SSVEC	SULPHUR SPRINGS VALLEY ELECTRIC COOPERATIVE
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
U	ULTRASONIC
UNO	UNLESS NOTED OTHERWISE
V	VOLT
VA	VOLTAMPERE
VVD	VARIABLE VOLUME DAMPER
W	WATTS
WP	WATER PROOF
XFMR	TRANSFORMER

GROUNDING

	AIR TERMINAL. DETAIL 5/EG501
	GROUNDING ROD. DETAIL 2/EG501
	GROUNDING ROD TEST WELL. DETAIL 1/EG501
	GROUNDING RECEPTACLE. DETAIL 3/EG501
	DOWN CONDUCTOR CONNECTION TO GROUND
	GRID COUNTERPOISE CONDUCTOR
	LIGHTNING PROTECTION ROOF CONDUCTOR
	LIGHTNING PROTECTION DOWN CONDUCTOR

AMENDMENT 3



- GENERAL NOTES:**
- SEE MOTOR SCHEDULE ON SHEET E-505
 - SEE PANEL SCHEDULES BEGINNING ON SHEET E-611
 - HAZARDOUS LOCATION NOTE: THE FLUID DISTRIBUTION ROOM SHALL BE CONSIDERED A CLASS I DIVISION 2 HAZARDOUS LOCATION. MOTORS, LIGHT FIXTURES, SWITCHES, AND ALL ELECTRICAL EQUIPMENT IN THIS ROOM SHALL USE EXPLOSIONPROOF ENCLOSURES, AND ALL CONDUITS SHALL BE THREADED RGS WITH MINIMUM 5 THREADS ENGAGED. PROVIDE CONDUIT SEALS IN CONDUIT SYSTEMS WITHIN 18" OF THE PERIMETER OF THE ROOM, AND WITHIN 18" OF MOTORS, SWITCHES, JUNCTION BOXES, AND LIGHT FIXTURES.
 - MOTOR DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, HORSEPOWER RATED.
 - ALL EXTERIOR RECEPTACLES SHALL HAVE GFCI PROTECTION, BE LISTED AS WEATHER RESISTANT TYPE, AND SHALL HAVE "IN-USE" TYPE WEATHERPROOF COVERS, AND THE COVER SHALL BE IDENTIFIED AS "EXTRA DUTY" PER NEC ARTICLE 406.9 (B)(1).

- KEYED NOTES:**
- THE SIPR / OPEN STORAGE ROOM HAS ADDED SECURITY REQUIREMENTS. FOLLOW NSTSSI 7000, TEMPEST COUNTERMEASURES. CONTRACTOR SHALL MINIMIZE CONDUIT PENETRATIONS INTO THIS ROOM. CONDUITS THAT PENETRATE THE ROOM PERIMETER SHALL HAVE ELECTRONIC ISOLATION: SPACE THE METALLIC CONDUIT WITH A SECTION OF PVC CONDUIT THAT EXTENDS A MINIMUM OF 3" ON EITHER SIDE OF THE SCIF WALL. COORDINATE WITH BASE AND USER SECURITY OFFICER PRIOR TO COMMENCEMENT OF WORK.
 - HVAC SHUTDOWN PER MECHANICAL REQUIREMENTS. COORDINATE WITH MECHANICAL PLANS AND CONTROLS.
 - ELECTRONIC EQUIPMENT SHUTDOWN PER NFPA 75, SECTION 11.4.6.4.1.3. SEE SINGLE LINE DIAGRAM FOR CONNECTIONS.

1 GTEB POWER PLAN - ADMIN.
1/8" = 1'-0"

<p>US Army Corps of Engineers</p>	
<p>ISSUE DATE: 07 OCT 2020 PROJECT # 22030665 SPEC # 2145 FILE NUMBER: ANS1'D W6SE GTEB CentralV</p>	<p>DATE: 07 OCT 2020 DESCRIPTION: RELOCATE MAIN PANELBOARD, NEG. 110, 26(C)(2)</p>
<p>DESIGNED BY: D. CARULLI PROJECT # 22030665 CHECKED BY: S. JONES SUBMITTED BY: /s/ JOHN R. PARRISH SIZE: FILE NAME: ANS1'D W6SE GTEB CentralV</p>	<p>MARK: 5</p>
<p>US ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT US DEPT OF ARMY</p>	
<p>SACRAMENTO DISTRICT IN-HOUSE DESIGN SACRAMENTO, CA 95814</p>	
<p>FT. HUACHUCA ARIZONA GROUND TRANSPORT EQUIPMENT BUILDING</p>	
<p>GTEB POWER PLAN</p>	
<p>SHEET ID EP102</p>	

AMENDMENT 3

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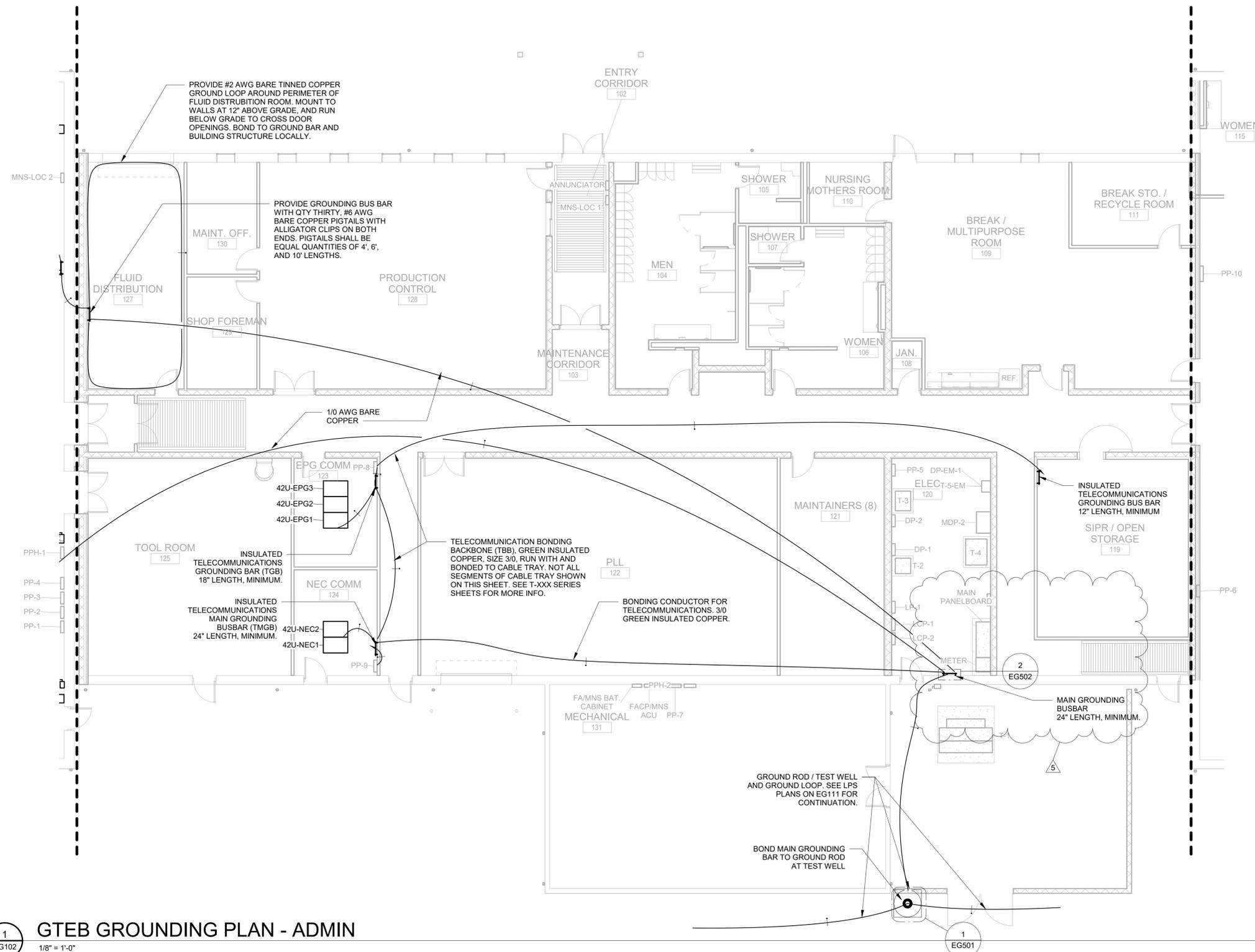
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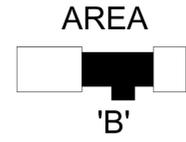
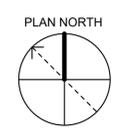
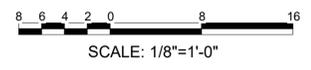
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1 GTEB GROUNDING PLAN - ADMIN
 1/8" = 1'-0"



AMENDMENT 3



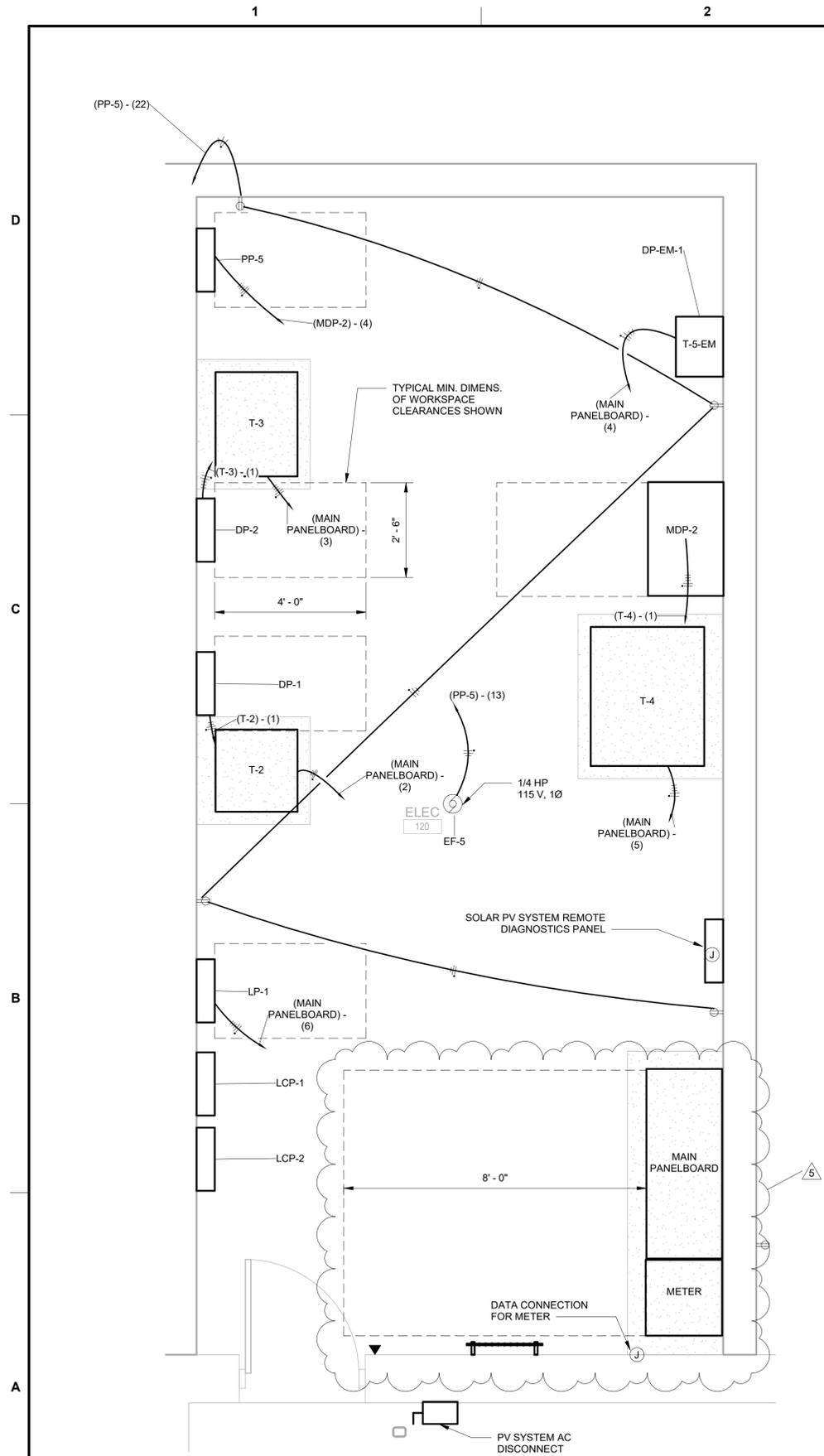
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of Engineers ©

ISSUE DATE:	07 OCT 2020	DATE	07 OCT 2020
DESIGNED BY:	D. CARULLI	PROJECT #	1602000000
CHECKED BY:	D. CARULLI	SPEC #	2145
DESIGNED BY:	S. JONES	FILE NUMBER:	
CHECKED BY:	S. JONES	FILE NAME:	ANSI'D W6SE GTEB Central.rvt
MARK	5	RELOCATE MAIN PANELBOARD, NEC 110.26(C)(2)	

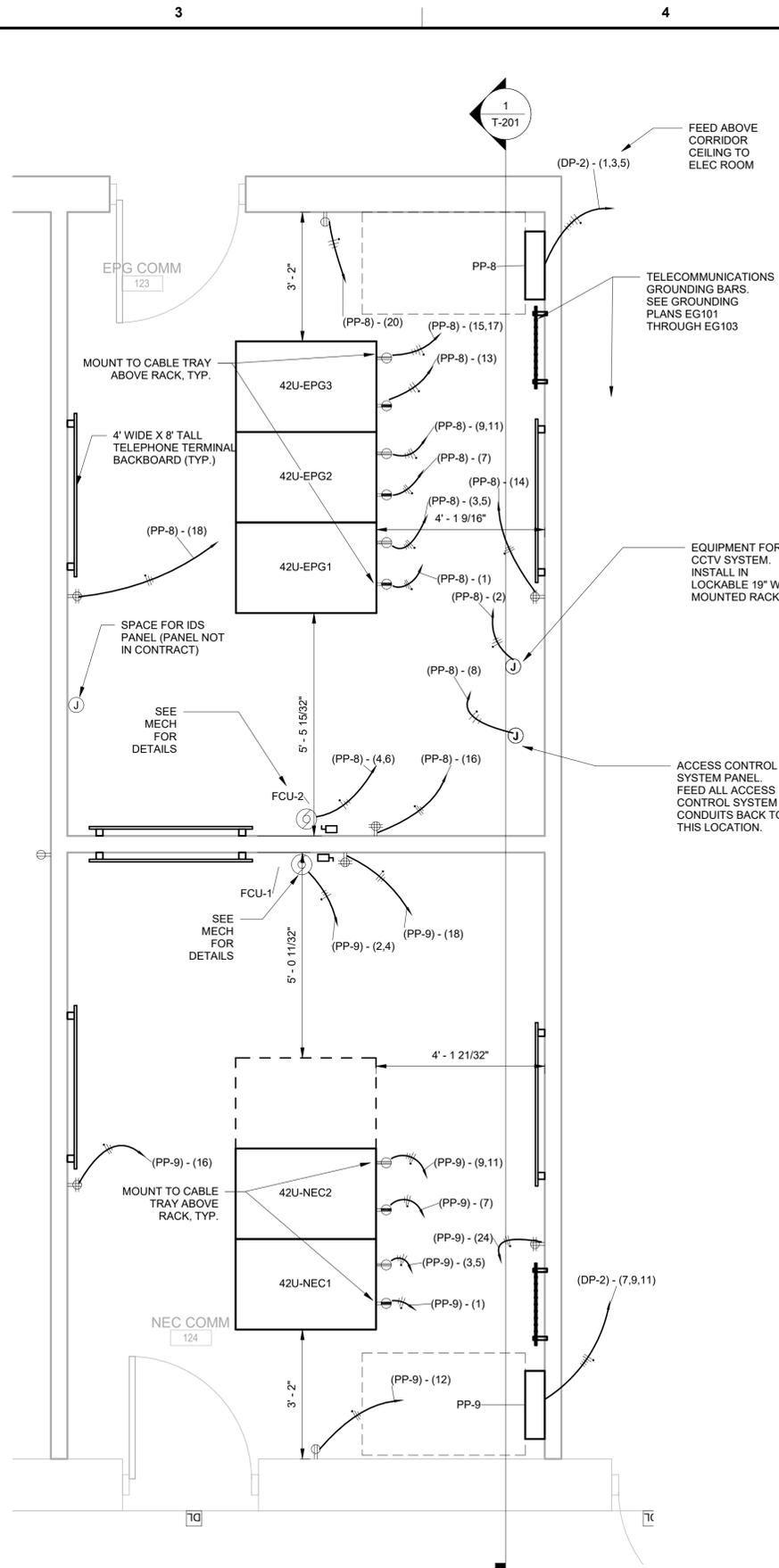
US ARMY CORPS OF ENGINEERS	SACRAMENTO DISTRICT	SACRAMENTO DISTRICT
SACRAMENTO DISTRICT	US DEPT OF ARMY	IN-HOUSE DESIGN
		SACRAMENTO, CA 95814

ARIZONA
GROUND TRANSPORT EQUIPMENT BUILDING
GTEB GROUNDING PLAN

SHEET ID
EG102



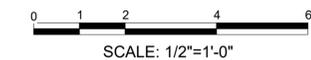
1 GTEB ENLARGED POWER FLOOR PLAN - ELEC
1/2" = 1'-0"



2 GTEB ENLARGED POWER FLOOR PLAN - COMM
1/2" = 1'-0"

GENERAL NOTES:

1. WORKSPACE CLEARANCES IN FRONT OF ELECTRICAL EQUIPMENT IS SHOWN.
2. CLEARANCE AROUND COMMUNICATIONS RACKS IS SHOWN. MINIMUM SHALL BE 3' ON SIDES, AND 4' IN FRONT AND BACK OF RACKS.
3. SEE SINGLE LINE DIAGRAM ON SHEET E-601 FOR CONNECTIONS BETWEEN DISTRIBUTION EQUIPMENT IN THE ELECTRICAL ROOM.
4. SEE TELECOMMUNICATIONS PLANS FOR ROUTING OF CABLE TRAY BETWEEN TELECOMMUNICATIONS ROOMS.



AMENDMENT 3

<p>US Army Corps of Engineers ©</p>	
DESIGNED BY: D. CARULLI PROJECT #: 23-0665 CHECKED BY: S. JONES SUBMITTED BY: /s/ JOHN R. PARRISH SIZE: FILE NAME: ANSI D: W6SE_GTEB_Central.rvt	ISSUE DATE: 07 OCT 2020 PROJECT #: 23-0665 SPEC #: 2145 FILE NUMBER: RELOCATE MAIN PANELBOARD, NEG. 110, 26(C)(2)
US ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT US DEPT OF ARMY	SACRAMENTO DISTRICT IN-HOUSE DESIGN SACRAMENTO, CA 95814
FT. HUACHUCA GROUND TRANSPORT EQUIPMENT BUILDING	ARIZONA ENLARGED ELECTRICAL PLANS
SHEET ID E-401	

D

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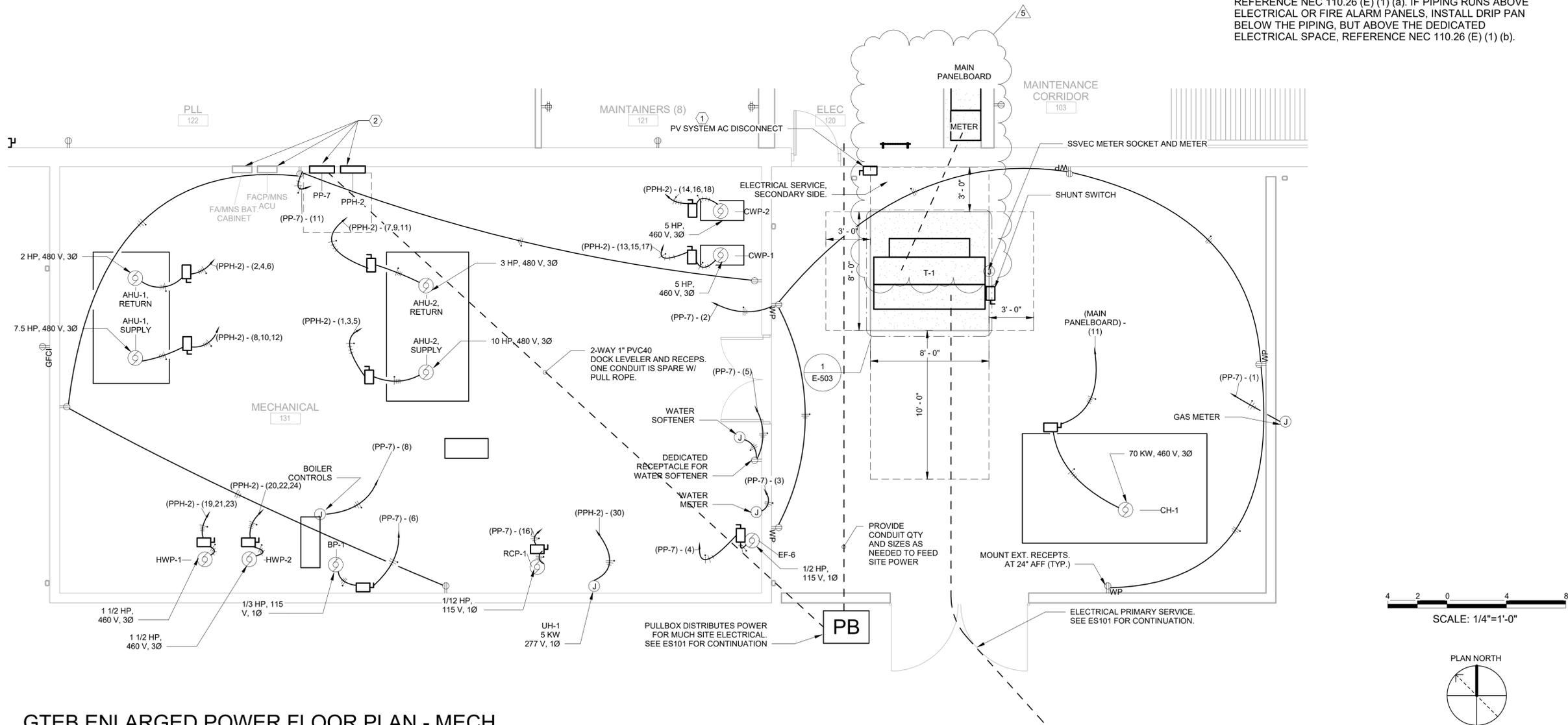
A

PLAN NOTES:

1. MINIMUM WORKSPACE CLEARANCES AROUND THE TRANSFORMER PAD ARE SHOWN ON MECHANICAL YARD PLAN.
2. APPROXIMATE BOUNDARIES OF MECHANICAL EQUIPMENT ARE SHOWN. ACTUAL LOCATION OF ELECTRICAL COMPONENTS WITHIN MECHANICAL EQUIPMENT ARE ESTIMATED. CONTRACTOR SHALL COORDINATE INSTALLATION WITH MECHANICAL PLANS.
3. CONTRACTOR SHALL COORDINATE ALL PATHWAYS WITH OTHER UTILITIES.
4. EQUIPMENT DISCONNECTS ARE NOT REQUIRED TO BE IN THE EXACT LOCATIONS SHOWN. MOUNT EQUIPMENT DISCONNECTS IN AN ACCESSIBLE LOCATION NEAR THE EQUIPMENT IT SERVES. THIS MAY BE ON AN ADJACENT WALL, THE EQUIPMENT ENCLOSURE IF SUITABLE FOR MOUNTING, OR ON A DEDICATED ANGLE IRON STRUCTURE (PROVIDED BY CONTRACTOR).

KEYED NOTES:

1. PV SYSTEM AC DISCONNECT SHALL MEET ALL REQUIREMENTS AS SPECIFIED IN THE SSVEC INTERCONNECT CUSTOMER HANDBOOK, AS WELL AS THE NEC. IT SHALL HAVE A NEMA 3R ENCLOSURE, VISIBLE OPEN, BE CAPABLE OF BEING PADLOCKED IN THE OPEN POSITION, AND BE LABELLED "PHOTOVOLTAIC SYSTEM AC DISCONNECT"
2. COORDINATE INSTALLATION OF ELECTRICAL AND FIRE ALARM PANELS WITH MECHANICAL WORK. MAINTAIN MINIMUM 6 FT CLEARANCE FOR DEDICATED ELECTRICAL SPACE ABOVE ELECTRICAL AND FIRE ALARM PANELS, REFERENCE NEC 110.26 (E) (1) (a). IF PIPING RUNS ABOVE ELECTRICAL OR FIRE ALARM PANELS, INSTALL DRIP PAN BELOW THE PIPING, BUT ABOVE THE DEDICATED ELECTRICAL SPACE, REFERENCE NEC 110.26 (E) (1) (b).



GTEB ENLARGED POWER FLOOR PLAN - MECH ROOM AND YARD

1 E-402 1/4" = 1'-0"



US Army Corps of Engineers ©

DATE	07 OCT 2020
DESCRIPTION	RELOCATE MAIN PANELBOARD, NEC 110.26(C)(2)
MARK	5

DESIGNED BY:	D. CARULLI	ISSUE DATE:	07 OCT 2020
DRAWN BY:	D. CARULLI	PROJECT #	22-00665
CHECKED BY:	S. JONES	SPEC #	2145
SUBMITTED BY:	/s/ JOHN R. PARRISH	FILE NUMBER:	
SIZE:	ANSI D / W6SE	FILE NAME:	GTEB_Central.rvt

US ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
US DEPT OF ARMY

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
SACRAMENTO, CA 95814

ARIZONA
GROUND TRANSPORT EQUIPMENT BUILDING

ENLARGED ELECTRICAL PLANS

SHEET ID
E-402

AMENDMENT 3

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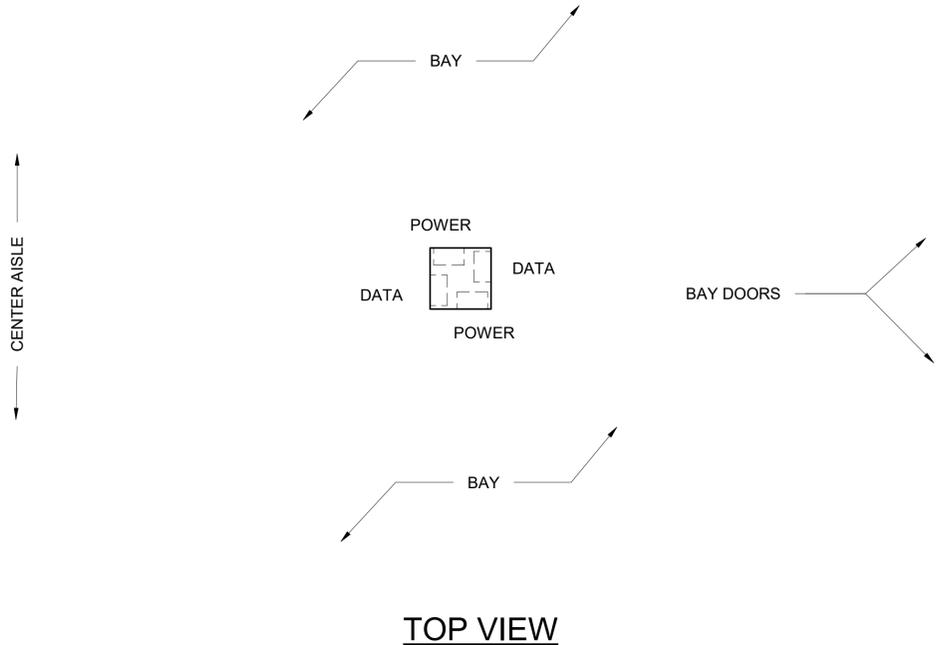
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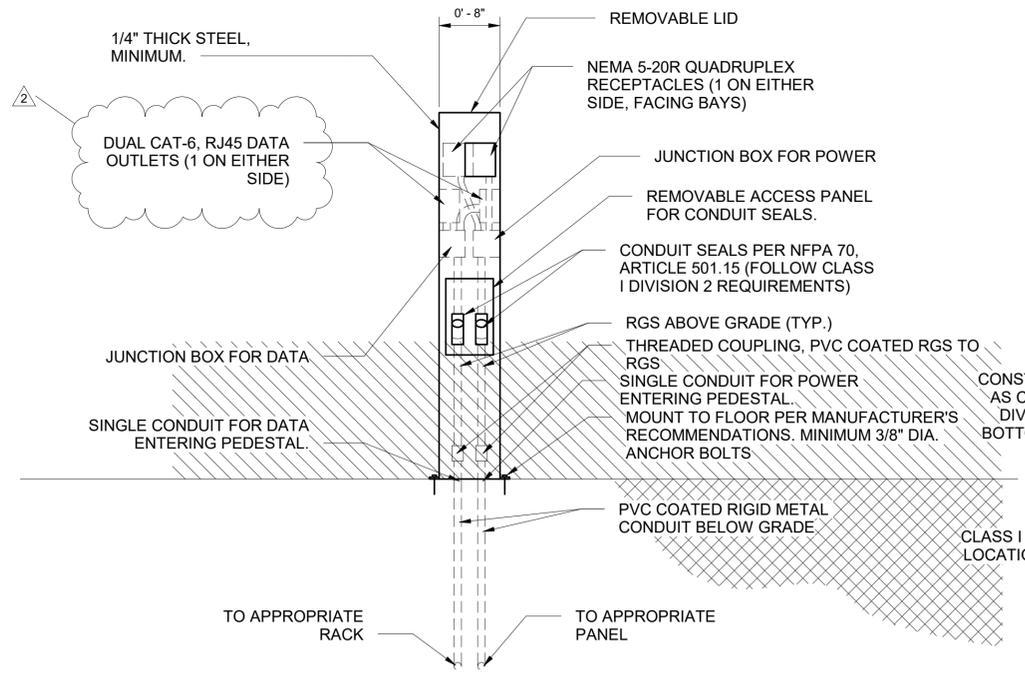
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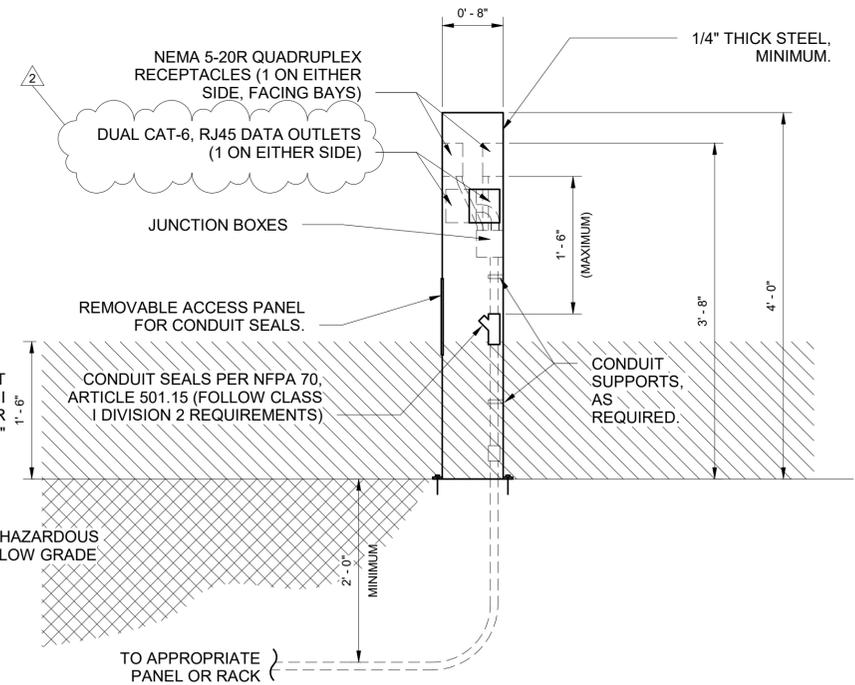
TOP VIEW

DETAIL NOTES:

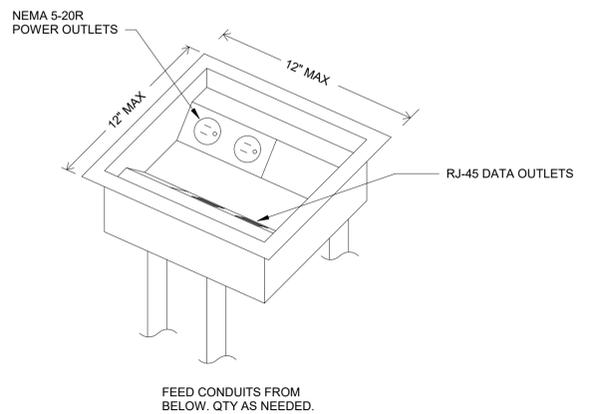
1. CONDUITS FEEDING THE PEDESTALS IN THE BAY AREA SHALL BE THREADED RIGID METAL CONDUIT. WHERE BELOW GRADE, CONDUITS SHALL BE PVC COATED RIGID METAL CONDUIT. CONNECTIONS SHALL HAVE A MINIMUM OF 5 THREADS ENGAGED.
2. DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL ENSURE THE PEDESTAL HAS ENOUGH SPACE FOR OUTLET BOXES, CONDUITS, SEALS, AND J-BOXES, WITHOUT EXCEEDING MINIMUM BENDING RADIUS OF CONDUCTORS. OUTLET BOXES MAY BE FURTHER OFFSET EITHER VERTICALLY OR HORIZONTALLY TO ALLOW SPACE FOR CONDUITS. SEE TOP VIEW FOR SUGGESTED OUTLET BOX HORIZONTAL OFFSET.
3. IF CONTRACTOR CANNOT SOURCE A PEDESTAL THAT CAN ACCOMODATE 2 QUADRUPLX RECEPTACLES AND 2 QUAD DATA OUTLETS, PROVIDE TWO SEPARATE PEDESTALS BETWEEN EACH BAY; ONE FOR POWER, AND ONE FOR DATA, WITH ALL OUTLETS FACING THE BAYS. SPACE THE PEDESTALS APPROXIMATELY 6' APART.
4. FOR COMMUNICATIONS CABLING, CONSULT MANUFACTURER OF CAT-6 CABLING TO DETERMINE MINIMUM CONDUIT SIZE TO FIT EIGHT CAT-6 CABLES (RATED FOR UNDERGROUND INSTALLATION). MINIMUM CONDUIT SIZE FOR COMMUNICATIONS CABLING IS 1", BUT THIS MAY NOT BE LARGE ENOUGH TO ACCOMODATE EIGHT CAT-6 CABLES. THE CAT-6 CABLE ITSELF SHALL BE SEALED IN ACCORDANCE WITH NEC ARTICLE 501.15 (E), BY STRIPPING THE JACKET OF THE CABLE AT THE CONDUIT SEAL. DO NOT UNTWIST TWISTED PAIRS.



FRONT VIEW



SIDE VIEW



FLOOR BOX DETAIL

1
E-504
POWER AND DATA PEDESTAL FOR BAYS
NOT TO SCALE

2
E-504
FLOOR BOX DETAIL
NOT TO SCALE

AMENDMENT 3



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DATE	DESCRIPTION	MARK
07 OCT 2020		2

DESIGNED BY: D. CARULLI	ISSUE DATE: 07 OCT 2020
DRAWN BY: D. CARULLI	PROJECT # 1623-0065
CHECKED BY: S. JONES	SPEC # 2145
SUBMITTED BY: /s/ JOHN R. PARRISH	FILE NUMBER: 2145
SIZE: ANSI D	FILE NAME: W6SE_GTEB_Central.rvt

US ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
US DEPT OF ARMY

SACRAMENTO DISTRICT
IN-HOUSE DESIGN
SACRAMENTO, CA 95814

ARIZONA
GROUND TRANSPORT EQUIPMENT BUILDING

DETAIL - POWER/COMM OUTLETS

SHEET ID
E-504

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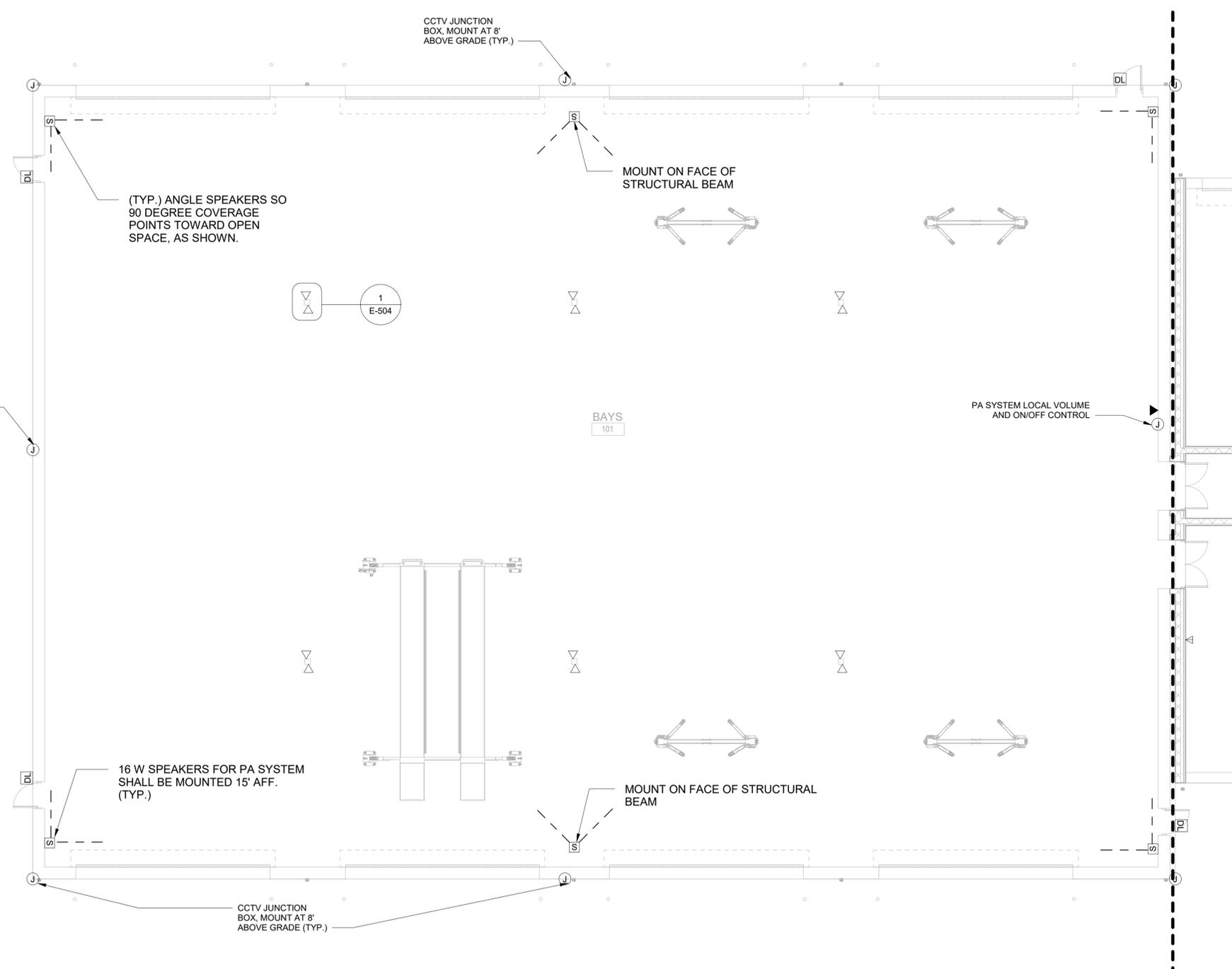
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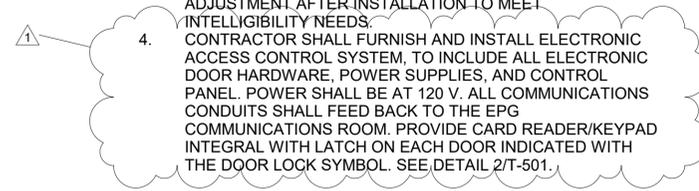
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GENERAL NOTES:

- UNLESS NOTED OTHERWISE, ALL VOICE SHALL BE FED FROM NEC COMMUNICATIONS ROOM.
- UNLESS NOTED OTHERWISE, ALL DATA SHALL BE FED FROM EPG COMMUNICATIONS ROOM.
- SPEAKERS IN THE BAY AREA FOR THE PA SYSTEM SHALL BE RATED AT 16 W, WITH MULTIPLE TAP SETTINGS FOR ADJUSTMENT AFTER INSTALLATION TO MEET INTELLIGIBILITY NEEDS.
- CONTRACTOR SHALL FURNISH AND INSTALL ELECTRONIC ACCESS CONTROL SYSTEM, TO INCLUDE ALL ELECTRONIC DOOR HARDWARE, POWER SUPPLIES, AND CONTROL PANEL. POWER SHALL BE AT 120 V. ALL COMMUNICATIONS CONDUITS SHALL FEED BACK TO THE EPG COMMUNICATIONS ROOM. PROVIDE CARD READER/KEYPAD INTEGRAL WITH LATCH ON EACH DOOR INDICATED WITH THE DOOR LOCK SYMBOL. SEE DETAIL 2/T-501.
- CONTRACTOR SHALL INSTALL JUNCTION BOXES AND CONDUITS WITH PULL STRINGS ONLY FOR INTERIOR AND BUILDING PERIMETER CCTV SYSTEM. CONNECT ALL CONDUITS BACK TO DVR LOCATION IN EPG COMM ROOM. CONTRACTOR SHALL INSTALL ALL DEVICES FOR EXTERIOR SITE PERIMETER CCTV SYSTEM.



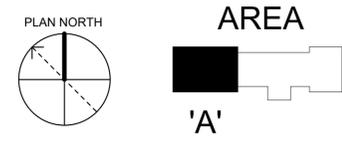
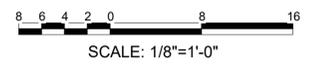
07 OCT 2020	DATE
1	MARK
1	CLARIFY ACS SCOPE
	DESCRIPTION

DESIGNED BY: D. CARULLI	ISSUE DATE: 07 OCT 2020
CHECKED BY: S. JONES	PROJECT # 22-0665
SUBMITTED BY: /s/ JOHN R. PARRISH	SPEC # 2145
ANSI D: W656	FILE NUMBER: GTEB_Central.rvt

US ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT US DEPT OF ARMY	ARIZONA GROUND TRANSPORT EQUIPMENT BUILDING
SACRAMENTO DISTRICT IN-HOUSE DESIGN SACRAMENTO, CA 95814	GTEB TELECOMMUNICATIONS PLAN

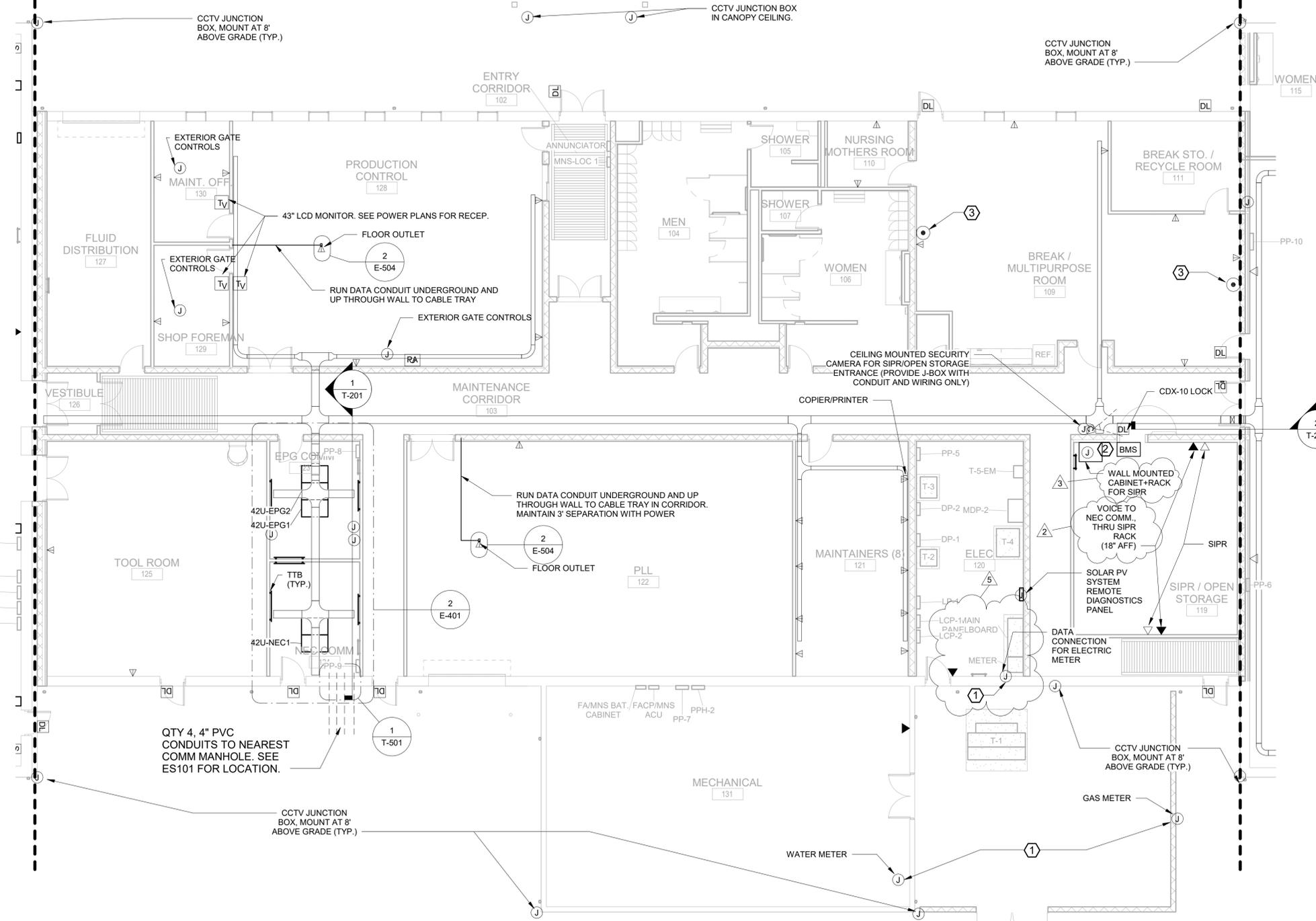
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1 GTEB COMM PLAN - BAYS
1/8" = 1'-0"



AMENDMENT 3

D
C
B
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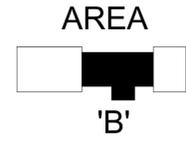
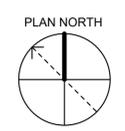
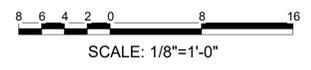


GENERAL NOTES:

- UNLESS NOTED OTHERWISE, ALL VOICE SHALL BE FED FROM NEC COMMUNICATIONS ROOM.
- UNLESS NOTED OTHERWISE, ALL DATA SHALL BE FED FROM EPG COMMUNICATIONS ROOM.
- DVR SHALL BE CAPABLE OF STORING CCTV VIDEO FOR 30 DAYS.
- CONTRACTOR SHALL FURNISH AND INSTALL ELECTRONIC ACCESS CONTROL SYSTEM, TO INCLUDE ALL ELECTRONIC DOOR HARDWARE, POWER SUPPLIES, AND CONTROL PANEL. POWER SHALL BE AT 120 V. ALL COMMUNICATIONS CONDUITS SHALL FEED BACK TO THE EPG COMMUNICATIONS ROOM. PROVIDE CARD READER/KEYPAD INTEGRAL WITH LATCH ON EACH DOOR INDICATED WITH THE DOOR LOCK SYMBOL. SEE DETAIL 2/T-501.
- CONTRACTOR SHALL INSTALL JUNCTION BOXES AND CONDUITS WITH PULL STRINGS ONLY FOR INTERIOR AND BUILDING PERIMETER CCTV SYSTEM. CONNECT ALL CONDUITS BACK TO DVR LOCATION IN EPG COMM ROOM. CONTRACTOR SHALL INSTALL ALL DEVICES FOR EXTERIOR SITE PERIMETER CCTV SYSTEM.
- CABLE TRAY IS FOR DATA AND VOICE ONLY. WIRING FOR CCTV SYSTEMS, ACCESS CONTROL SYSTEMS, INTRUSION DETECTION SYSTEMS, PA SYSTEM, GATE CONTROLS, AND OTHER BUILDING CONTROLS WIRING SHALL NOT BE PERMITTED TO BE PLACED IN THE CABLE TRAY. CONTRACTOR SHALL RUN THIS WIRING IN CONDUITS AS APPROPRIATE TO THEIR RESPECTIVE SYSTEMS.

KEYED NOTES:

- CONNECT UTILITY METERS THROUGH NEC COMM ROOM TO EXISTING BASE-WIDE ENERGY MANAGEMENT AND CONTROL SYSTEM (EMCS). PROVIDE DATA CONNECTIONS TO METERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- THE SIPR / OPEN STORAGE ROOM HAS ADDED SECURITY REQUIREMENTS. FOLLOW NSTSSI 7000, TEMPEST COUNTERMEASURES. CONTRACTOR SHALL MINIMIZE CONDUIT PENETRATIONS INTO THIS ROOM. CONDUITS THAT PENETRATE THE ROOM PERIMETER SHALL HAVE ELECTRONIC ISOLATION: SPACE THE METALLIC CONDUIT WITH A SECTION OF PVC CONDUIT THAT EXTENDS A MINIMUM OF 3" ON EITHER SIDE OF THE SCIF WALL. COORDINATE WITH BASE AND USER SECURITY OFFICER PRIOR TO COMMENCEMENT OF WORK.
- FEED CATV COAX OUTLETS WITH COAX CABLE TO THE EPG COMM ROOM. COAX CABLING CAN BE LAYED IN CABLE TRAY WITH DATA/VOICE CABLING.
- INTRUSION DETECTION SYSTEM (IDS) COMPONENTS FOR THE SIPR/OPEN STORAGE ENTRANCE DOOR, TO INCLUDE BMS, CDX-10 LOCK, CCTV CAMERA, AND IDS PANEL SHALL BE GOVERNMENT FURNISHED, GOVERNMENT INSTALLED (GFGI). CONTRACTOR SHALL PROVIDE J-BOXES AND CONDUIT WITH PULL STRINGS CONNECTING THESE COMPONENTS SO THAT USER MAY INSTALL IDS DEVICES AND WIRING. CONDUIT SHALL BE MINIMUM 1" EMT, AND SHALL CONNECT FROM BOTH THE BMS AND CCTV CAMERA LOCATIONS TO THE IDS PANEL LOCATION IN THE EPG COMM ROOM.



AMENDMENT 3



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DATE	DESCRIPTION
07 OCT 2020	CLARIFY ACS SCOPE
07 OCT 2020	RELOCATE MAIN PANELBOARD, NEC 110.26(C)(2)
07 OCT 2020	CLARIFY EQUIPMENT CABINET AND RACK
07 OCT 2020	DATA OUTLET QTY CLARIFY

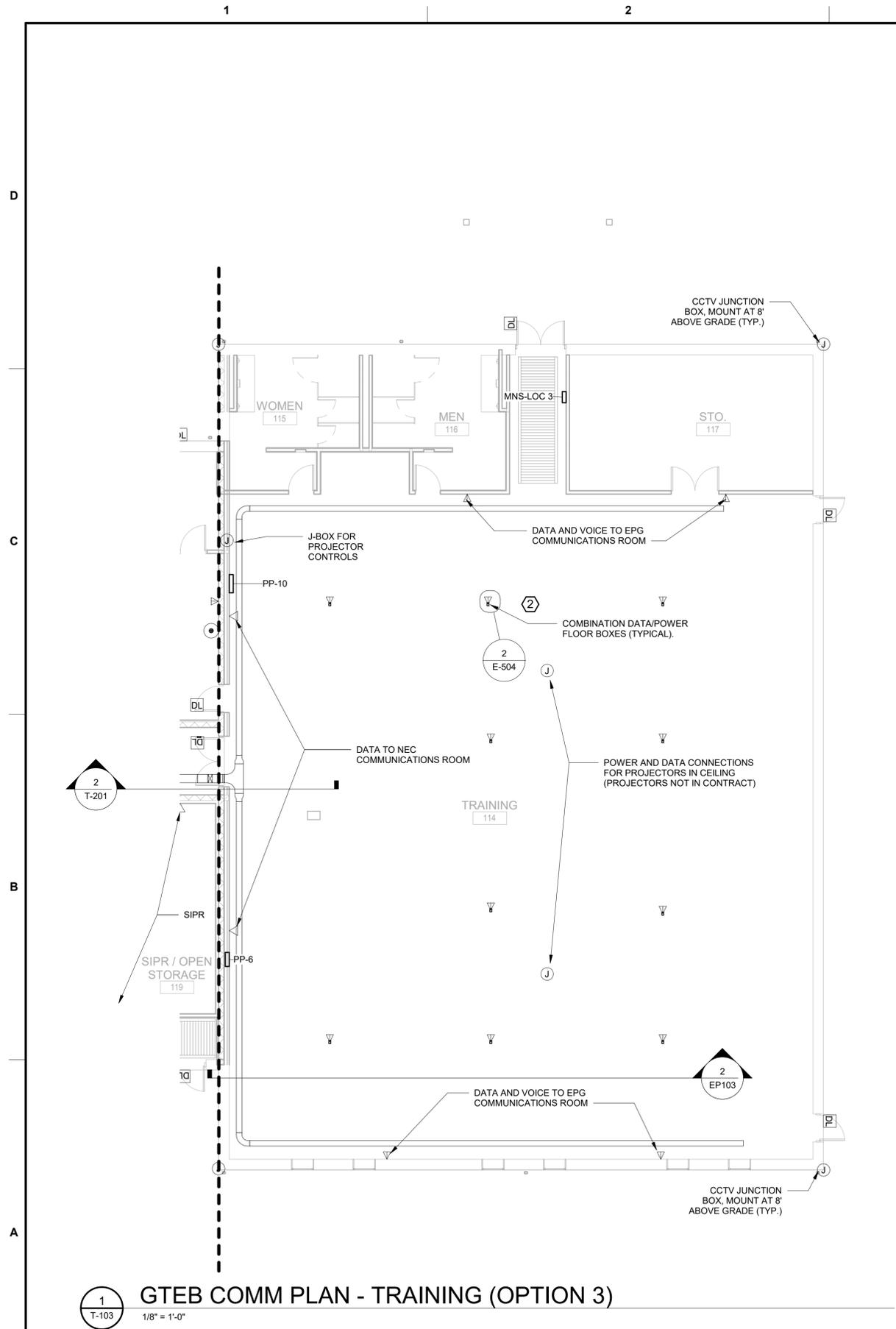
ISSUE DATE:	DESIGNED BY:	US ARMY CORPS OF ENGINEERS
07 OCT 2020	D. CARULLI	SACRAMENTO DISTRICT
PROJECT #	D. CARULLI	SACRAMENTO DISTRICT
52623-90605	CHECKED BY:	US DEPT OF ARMY
2145	S. JONES	
FILE NUMBER:	SUBMITTED BY:	SACRAMENTO DISTRICT
	/s/ JOHN R. PARRISH	IN-HOUSE DESIGN
	FILE NAME:	SACRAMENTO, CA 95814
	ANSI D: W606	GTEB Central.rvt

ARIZONA
GROUND TRANSPORT EQUIPMENT BUILDING

GTEB TELECOMMUNICATIONS PLAN

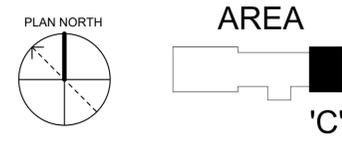
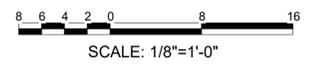
SHEET ID
T-102

1
T-102
GTEB COMM PLAN - ADMIN.
1/8" = 1'-0"



- GENERAL NOTES:**
- UNLESS NOTED OTHERWISE, ALL VOICE SHALL BE FED FROM NEC COMMUNICATIONS ROOM.
 - UNLESS NOTED OTHERWISE, ALL DATA SHALL BE FED FROM EPG COMMUNICATIONS ROOM.
 - PROJECTOR SCREENS SHALL BE WIRED FOR VIDEO-TELECONFERENCE CAPABILITY.
 - CONTRACTOR SHALL FURNISH AND INSTALL ELECTRONIC ACCESS CONTROL SYSTEM, TO INCLUDE ALL ELECTRONIC DOOR HARDWARE, POWER SUPPLIES, AND CONTROL PANEL. POWER SHALL BE AT 120 V. ALL COMMUNICATIONS CONDUITS SHALL FEED BACK TO THE EPG COMMUNICATIONS ROOM. PROVIDE CARD READER/KEYPAD INTEGRAL WITH LATCH ON EACH DOOR INDICATED WITH THE DOOR LOCK SYMBOL. SEE DETAIL 2/T-501.
 - CONTRACTOR SHALL INSTALL JUNCTION BOXES AND CONDUITS WITH PULL STRINGS ONLY FOR INTERIOR AND BUILDING PERIMETER CCTV SYSTEM. CONNECT ALL CONDUITS BACK TO DVR LOCATION IN EPG COMM ROOM. CONTRACTOR SHALL INSTALL ALL DEVICES FOR EXTERIOR SITE PERIMETER CCTV SYSTEM.
 - CABLE TRAY IS FOR DATA AND VOICE ONLY. WIRING FOR CCTV SYSTEMS, ACCESS CONTROL SYSTEMS, INTRUSION DETECTION SYSTEMS, PA SYSTEM, GATE CONTROLS, AND OTHER BUILDING CONTROLS WIRING SHALL NOT BE PERMITTED TO BE PLACED IN THE CABLE TRAY. CONTRACTOR SHALL RUN THIS WIRING IN CONDUITS AS APPROPRIATE TO THEIR RESPECTIVE SYSTEMS.

- KEYED NOTES:**
- FOR FLOOR BOXES, PROVIDE COMBINATION POWER/DATA FLOOR BOXES, BUT DO NOT INSTALL DATA CONDUCTORS OR DATA OUTLETS. PROVIDE CONDUIT PATHWAY TO CABLE TRAY WITH PULL ROPE ONLY. (POWER RECEPTACLE SHALL BE FULLY INSTALLED AND CONNECTED). CONDUIT RUNS FOR DATA AND POWER SHALL BE RUN PERPENDICULAR TO EACH OTHER IN THE FLOOR.
 - SEE SHEET EP103 FOR ROUTING OF POWER AND DATA CONDUITS TO FLOOR OUTLETS.



1 GTEB COMM PLAN - TRAINING (OPTION 3)
1/8" = 1'-0"

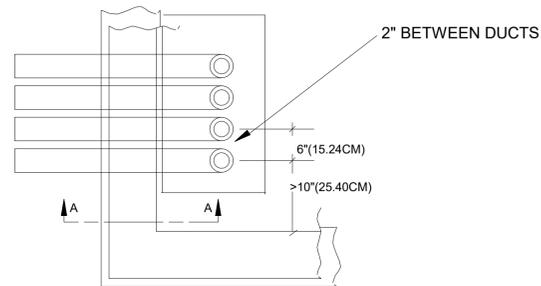
 US Army Corps of Engineers	
	DATE 07 OCT 2020
DESCRIPTION	
1	MARK
DESIGNED BY: D. CARULLI CHECKED BY: S. JONES SUBMITTED BY: /s/ JOHN R. PARRISH SIZE: FILE NAME: ANSI D: W6SE_GTEB_Central.rvt	ISSUE DATE: 07 OCT 2020 PROJECT #: 6723-0065 SPEC #: 2145 FILE NUMBER: ANSISID: W6SE_GTEB_Central.rvt
US ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT US DEPT OF ARMY	SACRAMENTO DISTRICT IN-HOUSE DESIGN SACRAMENTO, CA 95814
FT. HUACHUCA GROUND TRANSPORT EQUIPMENT BUILDING	ARIZONA GTEB TELECOMMUNICATIONS PLAN (OPTION 3)
SHEET ID	
T-103	

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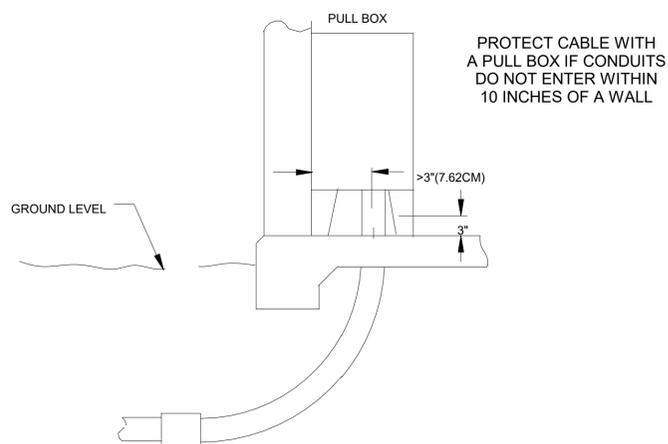
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TOP VIEW

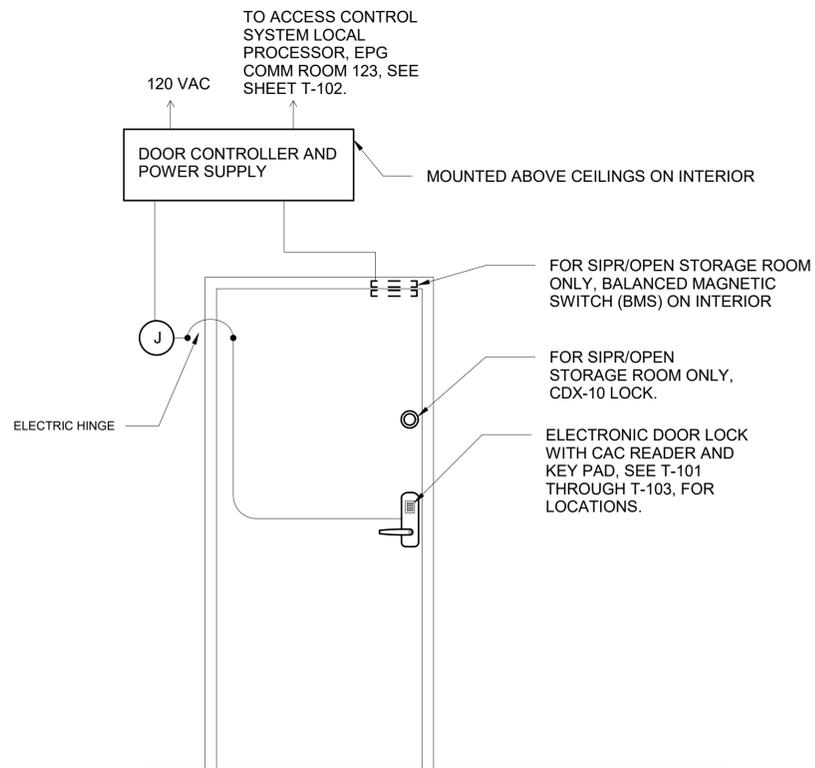


SECTION A-A
SLAB ON GRADE FOUNDATION

COMMUNICATIONS SERVICE ENTRANCE DETAIL

1
T-501

NOT TO SCALE



DOOR LOCK DETAIL

2
T-501

NOT TO SCALE

DETAIL NOTES:

1. EXTERIOR COMPONENTS SHALL BE WEATHERPROOF.
2. PROVIDE THIS DOOR LOCK CONFIGURATION AT EACH LOCATION WHERE A DOOR LOCK IS INDICATED ON SHEETS T-101 THROUGH T-103, AND EP111 (FOR STORAGE BUILDINGS).
3. PROVIDE THIS DOOR LOCK CONFIGURATION AT THE PEDESTRIAN DOORS TO THE HAZMAT AND POL STORAGE BUILDINGS. MOUNT DOOR CONTROLLER AND POWER SUPPLY ON THE WALL SPACE ON THE INTERIOR OF THE STORAGE ROOMS. ENCLOSURES SHALL BE EXPLOSION PROOF IN THESE BUILDINGS. FOLLOW SPEC SECTION 28 10 05.
- 4.

AMENDMENT 3



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MARK	CLARIFY ACS SCOPE	DESCRIPTION	DATE
1			07 OCT 2020

DESIGNED BY: D. CARULLI	ISSUE DATE: 07 OCT 2020
CHECKED BY: S. JONES	PROJECT # 23-0665
SUBMITTED BY: /s/ JOHN R. PARRISH	SPEC # 2145
FILE NAME: ANSI'D_WGSE_GTEB_Central.rvt	FILE NUMBER: 2145

US ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT US DEPT OF ARMY	ARIZONA GROUND TRANSPORT EQUIPMENT BUILDING
SACRAMENTO DISTRICT IN-HOUSE DESIGN SACRAMENTO, CA 95814	SYSTEMS DETAILS

SHEET ID T-501

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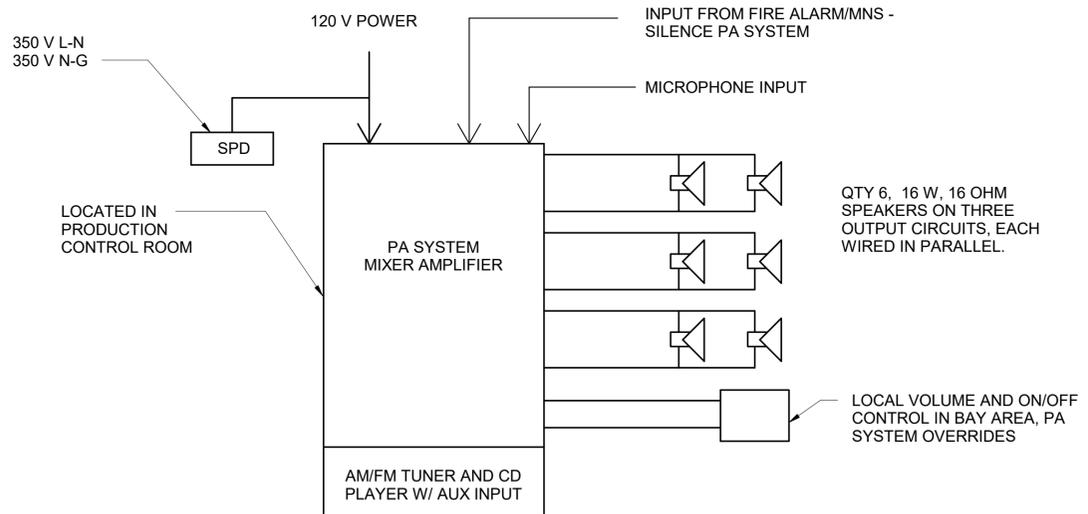
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MARK	DESCRIPTION	DATE
4	CLARIFY CCTV SCOPE	07 OCT 2020

DESIGNED BY: D. CARULLI	ISSUE DATE: 07 OCT 2020
DRAWN BY: D. CARULLI	PROJECT # 22-0665
CHECKED BY: S. JONES	SPEC # 2145
SUBMITTED BY: /s/ JOHN R. PARRISH	FILE NUMBER:
SIZE: ANSI D	FILE NAME: W6SE_GTEB_Central.rvt
US ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT US DEPT OF ARMY	SACRAMENTO DISTRICT IN-HOUSE DESIGN SACRAMENTO, CA 95814

ARIZONA
GROUND TRANSPORT EQUIPMENT BUILDING
COMMUNICATIONS CIRCUIT DIAGRAMS

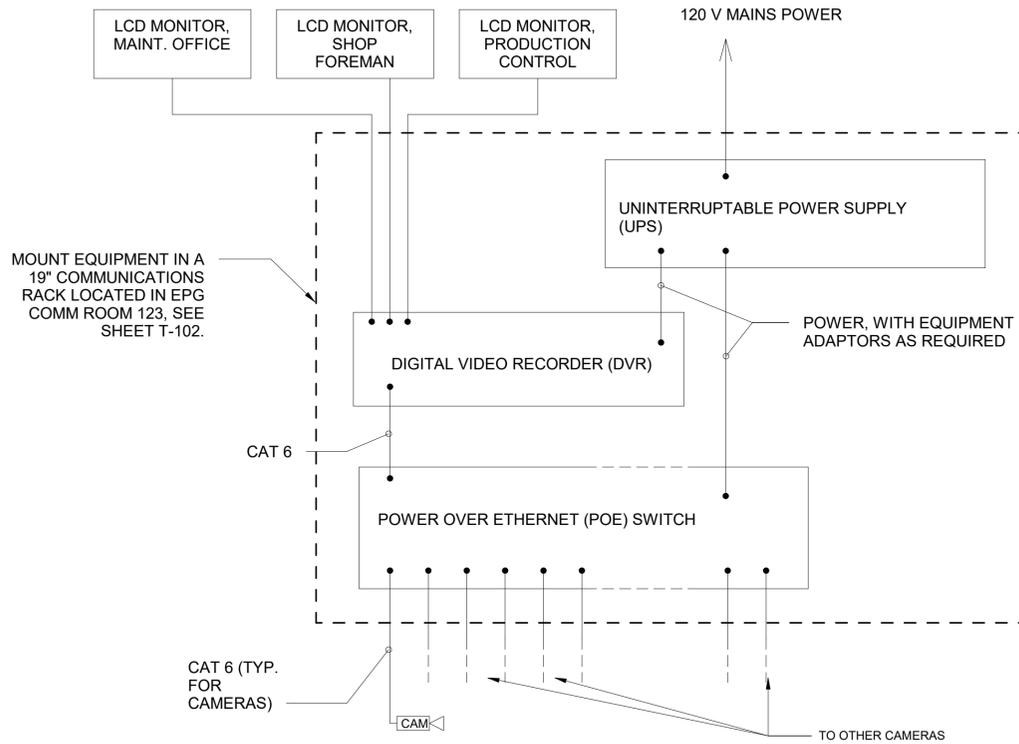
SHEET ID
T-502



DETAIL NOTES:

- SEE SPEC SECTION 27 51 16 FOR ADDITIONAL INFORMATION.
- PROVIDE 19" WALL MOUNTED RACK FOR PA SYSTEM EQUIPMENT, LOCATION AS INDICATED IN PLANS. SEE SHEET T-102
- SPEAKERS MAY BE RATED AT HIGHER WATTAGE, WITH LOWER 16 W TAP SETTING USED FOR INSTALLATION.

2
T-502
PUBLIC ADDRESS SYSTEM DIAGRAM
NOT TO SCALE



GENERAL NOTES:

- SEE SPEC SECTIONS FOR ADDITIONAL DETAILS
- TYPICALLY, CCTV EQUIPMENT IS GFGI. CONTRACTOR SHALL INSTALL J-BOXES AND CONDUIT SYSTEMS WITH PULL STRINGS CONNECTING EQUIPMENT LOCATIONS FOR CCTV EQUIPMENT, FOR USER TO INSTALL CAMERAS, CABLING AND EQUIPMENT (CAMERAS, DVR, POE SWITCH, UPS, AND MONITORS). CONTRACTOR SHALL FURNISH AND INSTALL RACK FOR CCTV EQUIPMENT. COORDINATE WITH PLANS FOR LOCATIONS OF EQUIPMENT AND CCTV CAMERA LOCATIONS.

1
T-502
SECURITY CAMERA SYSTEM DIAGRAM
NOT TO SCALE

AMENDMENT 3

