

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE	PAGE 1 OF 41 PAGES
2. AMENDMENT/MODIFICATION NO. AMENDMENT NO. 0001		3. EFFECTIVE DATE 7/14/11	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable) 07-0008
6. ISSUED BY CODE		jsy	7. ADMINISTERED BY (If other than Item 6) CODE See Item 6	
Officer in Charge of Construction MCI-East 1005 Michael Road Camp Lejeune, NC 28547-2521				
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)			(X)	9A. AMENDMENT OF SOLICITATION NO. N40085-07-R-0008
			X	9B. DATED (SEE ITEM 11) 7/11/11
				10A. MODIFICATION OF CONTRACT/ORDER NO.
				10B. DATED (SEE ITEM 11)
CODE	FACILITY CODE			

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 _____ 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.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

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

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

070008, Replace Chiller, Bldgs 59 & 60, Camp Lejeune, NC

The following specification section and drawings are hereby incorporated into the RFP (Request for Proposals) dated 11 July 2011: Specification section 23 05 93, "Testing, Adjusting, and Balancing for HVAC," and eight drawings are attached.

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	
15C. DATE SIGNED		16C. DATE SIGNED	
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

08/09

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 62.1 (2010; Errata 2010; Errata 2011) Ventilation for Acceptable Indoor Air Quality

ASSOCIATED AIR BALANCE COUNCIL (AABC)

AABC MN-1 (2002; 6th ed) National Standards for Total System Balance

AABC MN-4 (1996) Test and Balance Procedures

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB MASV (2006) Procedural Standards for Measurements and Assessment of Sound and Vibration

NEBB PROCEDURAL STANDARDS (2005) Procedural Standards for TAB (Testing, Adjusting and Balancing) Environmental Systems

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1143 (1985) HVAC Air Duct Leakage Test Manual, 1st Edition

SMACNA 1780 (2002) HVAC Systems - Testing, Adjusting and Balancing, 3rd Edition

SMACNA 1858 (2004) HVAC Sound And Vibration Manual - First Edition

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 82 Protection of Stratospheric Ozone

1.2 DEFINITIONS

- a. AABC: Associated Air Balance Council.

- b. COTR: Contracting Officer's Technical Representative.
- c. DALT: Duct air leakage test
- d. DALT'd: Duct air leakage tested
- e. HVAC: Heating, ventilating, and air conditioning; or heating, ventilating, and cooling.
- f. NEBB: National Environmental Balancing Bureau
- g. Out-of-tolerance data: Pertains only to field acceptance testing of Final DALT or TAB report. When applied to DALT work, this phase means "a leakage rate measured during DALT field acceptance testing which exceeds the leakage rate allowed by SMACNA Leak Test Manual for an indicated duct construction and sealant class." "a leakage rate measured during DALT field acceptance testing which exceeds the leakage rate allowed by Appendix D REQUIREMENTS FOR DUCT AIR LEAK TESTING." When applied to TAB work this phase means "a measurement taken during TAB field acceptance testing which does not fall within the range of plus 5 to minus 5 percent of the original measurement reported on the TAB Report for a specific parameter."
- h. Season of maximum heating load: The time of year when the outdoor temperature at the project site remains within plus or minus 30 degrees Fahrenheit of the project site's winter outdoor design temperature, throughout the period of TAB data recording.
- i. Season of maximum cooling load: The time of year when the outdoor temperature at the project site remains within plus or minus 5 degrees Fahrenheit of the project site's summer outdoor design temperature, throughout the period of TAB data recording.
- j. Season 1, Season 2: Depending upon when the project HVAC is completed and ready for TAB, Season 1 is defined, thereby defining Season 2. Season 1 could be the season of maximum heating load, or the season of maximum cooling load.
- k. Sound measurements terminology: Defined in AABC MN-1, NEBB MASV, or SMACNA 1858 (TABB).
- l. TAB: Testing, adjusting, and balancing (of HVAC systems).
- m. TAB'd: HVAC Testing/Adjusting/Balancing procedures performed.
- n. TAB Agency: TAB Firm
- o. TAB team field leader: TAB team field leader
- p. TAB team supervisor: TAB team engineer.
- q. TAB team technicians: TAB team assistants.
- r. TABB: Testing Adjusting and Balancing Bureau.

1.2.1 Similar Terms

In some instances, terminology differs between the Contract and the TAB

Standard primarily because the intent of this Section is to use the industry standards specified, along with additional requirements listed herein to produce optimal results.

The following table of similar terms is provided for clarification only. Contract requirements take precedent over the corresponding AABC, NEBB, or TABB requirements where differences exist.

SIMILAR TERMS

Contract Term	AABC Term	NEBB Term	TABB Term
TAB Standard	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems	Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems	International Standards for Environmental Systems Balance
TAB Specialist	TAB Engineer	TAB Supervisor	TAB Supervisor
Systems Readiness Check	Construction Phase Inspection	Field Readiness Check & Preliminary Field Procedures.	Field Readiness Check & Prelim. Field Procedures

1.3 WORK DESCRIPTION

The work includes testing, adjusting, and balancing (TAB) of new and existing heating, ventilating, and cooling (HVAC) air and water distribution systems including equipment and performance data, ducts, and piping which are located within, on, under, between, and adjacent to buildings, including records of existing conditions.

See reference drawings (included):

Building 59: 4448469
4448470
4448503
4448504

Building 60: 4448527
4448528
4448556
4448557

Perform TAB in accordance with the requirements of the TAB procedural standard recommended by the TAB trade association that approved the TAB Firm's qualifications. Comply with requirements of AABC MN-1, NEBB PROCEDURAL STANDARDS, or SMACNA 1780 (TABB) as supplemented and modified by this specification section. All recommendations and suggested practices contained in the TAB procedural standards are considered mandatory.

Conduct TAB of the indicated existing systems and equipment and submit the specified TAB reports for approval. Conduct DALT testing in compliance

with the requirements specified in [SMACNA 1143](#), except as supplemented and modified by this section. Conduct TAB work in accordance with the requirements of this section.

1.3.1 Air Distribution Systems

Test, adjust, and balance systems (TAB) in compliance with this section. Obtain Contracting Officer's written approval before applying insulation to exterior of air distribution systems as specified under Section [23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS](#).

1.3.2 Water Distribution Systems

TAB systems in compliance with this section. Obtain Contracting Officer's written approval before applying insulation to water distribution systems as specified under Section [23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS](#). At Contractor's option and with Contracting Officer's written approval, the piping systems may be insulated before systems are TAB'd.

Terminate piping insulation immediately adjacent to each flow control valve, automatic control valve, or device. Seal the ends of pipe insulation and the space between ends of pipe insulation and piping, with waterproof vapor barrier coating.

After completion of work under this section, insulate the flow control valves and devices as specified under Section [23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS](#).

1.3.3 TAB SCHEMATIC DRAWINGS

Show the following information on TAB Schematic Drawings:

1. A unique number or mark for each piece of equipment or terminal.
2. Air quantities at air terminals.
3. Air quantities and temperatures in air handling unit schedules.
4. Water quantities and temperatures in thermal energy transfer equipment schedules.
5. Water quantities and heads in pump schedules.
6. Water flow measurement fittings and balancing fittings.

The Testing, Adjusting, and Balancing (TAB) Specialist must review the Contract Plans and Specifications and advise the Contracting Officer of any deficiencies that would prevent the effective and accurate TAB of the system, including [records of existing conditions](#), and [systems readiness check](#). The TAB Specialist must provide a [Design Review Report](#) individually listing each deficiency and the corresponding proposed corrective action necessary for proper system operation.

Submit 5 copies of the [TAB Schematic Drawings and Report Forms](#) to the Contracting Officer, no later than 21 days prior to the start of TAB field measurements.

1.3.4 Related Requirements

Specific requirements relating to Reliability Centered Maintenance (RCM) principals and Predictive Testing and Inspection (PTI), by the construction contractor to detect latent manufacturing and installation defects must be followed as part of the Contractor's Quality Control program. Refer to the paragraph titled "Sustainability" for detailed requirements.

Requirements for price breakdown of HVAC TAB work are specified in Section 01 20 00.00 20 PRICE AND PAYMENT PROCEDURES.

Requirements for construction scheduling related to HVAC TAB work are specified in Section 01 32 17.00 20 NETWORK ANALYSIS SCHEDULES (NAS).

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Records of Existing Conditions

TAB Firm

Designation of TAB team assistants

Designation of TAB team engineer or TAB Specialist

Designation of TAB team field leader

SD-02 Shop Drawings

TAB Schematic Drawings and Report Forms

SD-03 Product Data

Equipment and Performance Data

TAB Related HVAC Submittals

A list of the TAB Related HVAC Submittals, no later than 14 days after the approval of the TAB team engineer.

TAB Procedures

Proposed procedures for TAB, submitted with the TAB Schematic Drawings and Report Forms.

Calibration

Systems Readiness Check

TAB Execution

TAB Verification

SD-06 Test Reports

TAB Work Execution Schedule

TAB Procedures Summary

Design review report

TAB report for Season 1

TAB report for Season 2

SD-07 Certificates

Independent TAB agency and personnel qualifications

Advance Notice of Season TAB Field Work

Completed Season 1 Pre-TAB Work Checklist

TAB Firm

Independent TAB Agency and Personnel Qualifications

TAB Submittal and Work Schedule

Design review report

Pre-field TAB engineering report

Prerequisite HVAC Work Check Out List For Season 1

Prerequisite HVAC Work Check Out List For Season 2

1.5 QUALITY ASSURANCE

1.5.1 Independent TAB Agency and Personnel Qualifications

To secure approval for the proposed agency, submit information certifying that the TAB agency is a first tier subcontractor who is not affiliated with any other company participating in work on this contract, including design, furnishing equipment, or construction. Further, submit the following, for the agency, to Contracting Officer for approval:

a. Independent AABC or NEBB or TABB TAB agency:

TAB agency: AABC registration number and expiration date of current certification; or NEBB certification number and expiration date of current certification; or TABB certification number and expiration date of current certification.

TAB team supervisor: Name and copy of AABC or NEBB or TABB TAB supervisor certificate and expiration date of current certification.

TAB team field leader: Name and documented evidence that the team field leader has satisfactorily performed full-time supervision of TAB work in the field for not less than 3 years immediately preceding this contract's bid opening date.

TAB team field technicians: Names and documented evidence that each

field technician has satisfactorily assisted a TAB team field leader in performance of TAB work in the field for not less than one year immediately preceding this contract's bid opening date.

Current certificates: Registrations and certifications are current, and valid for the duration of this contract. Renew Certifications which expire prior to completion of the TAB work, in a timely manner so that there is no lapse in registration or certification. TAB agency or TAB team personnel without a current registration or current certification are not to perform TAB work on this contract.

- b. TAB Team Members: TAB team approved to accomplish work on this contract are full-time employees of the TAB agency. No other personnel is allowed to do TAB work on this contract.
- c. Replacement of TAB team members: Replacement of members may occur if each new member complies with the applicable personnel qualifications and each is approved by the Contracting Officer.

1.5.2 TAB Standard

Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1, NEBB PROCEDURAL STANDARDS, or SMACNA 1780 unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard are considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practical, to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations.

All quality assurance provisions of the TAB Standard such as performance guarantees are part of this contract. For systems or system components not covered in the TAB Standard, TAB procedures must be developed by the TAB Specialist. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are considered mandatory, including the latest requirements of ASHRAE 62.1.

1.5.3 Sustainability

Contractor must submit the following as part of the Quality Control Plan for acceptance testing:

- a. List all test equipment to be used, including its manufacturer, model number, calibration date, and serial number.
- b. Certificates of test personnel qualifications and certifications. Provide certification of compliance with 40 CFR 82.
- c. Proof of equivalency if the contractor desires to substitute a test requirement.

1.5.4 Qualifications

1.5.4.1 TAB Firm

The TAB Firm must be either a member of AABC or certified by the NEBB or the TABB and certified in all categories and functions where measurements or performance are specified on the plans and specifications.

Certification must be maintained for the entire duration of duties specified herein. If, for any reason, the firm loses subject certification during this period, the Contractor must immediately notify the Contracting Officer and submit another TAB Firm for approval. Any firm that has been the subject of disciplinary action by either the AABC, the NEBB, or the TABB within the five years preceding Contract Award is not be eligible to perform any duties related to the HVAC systems, including TAB. All work specified in this Section and in other related Sections to be performed by the TAB Firm will be considered invalid if the TAB Firm loses its certification prior to Contract completion and must be performed by an approved successor.

These TAB services are to assist the prime Contractor in performing the quality oversight for which it is responsible. The TAB Firm must be a prime subcontractor of the Contractor and be financially and corporately independent of the mechanical subcontractor, reporting directly to and paid by the Contractor.

1.5.4.2 TAB Specialist

The TAB Specialist must be either a member of AABC, an experienced technician of the Firm certified by the NEBB, or a Supervisor certified by the TABB. The certification must be maintained for the entire duration of duties specified herein. If, for any reason, the Specialist loses subject certification during this period, immediately notify the Contracting Officer and submit another TAB Specialist for approval. Any individual that has been the subject of disciplinary action by either the AABC, the NEBB, or the TABB within the five years preceding Contract Award is not eligible to perform any duties related to the HVAC systems, including TAB. All work specified in this Section and in other related Sections performed by the TAB Specialist will be considered invalid if the TAB Specialist loses its certification prior to Contract completion and must be performed by the approved successor.

1.5.4.3 TAB Specialist Responsibilities

TAB Specialist responsibilities include all TAB work specified herein and in related sections under his direct guidance. The TAB specialist is required to be onsite on a daily basis to direct TAB efforts.

1.5.4.4 TAB Related HVAC Submittals

The TAB Specialist must prepare a list of the submittals from the Contract Submittal Register that relate to the successful accomplishment of all HVAC TAB. Accompany the submittals identified on this list with a letter of approval signed and dated by the TAB Specialist when submitted to the Government. Ensure that the location and details of ports, terminals, connections, etc., necessary to perform TAB are identified on the submittals.

1.5.5 Responsibilities

The Contractor is responsible for ensuring compliance with the requirements of this section. The following delineation of specific work responsibilities is specified to facilitate TAB execution of the various work efforts by personnel from separate organizations. This breakdown of specific duties is specified to facilitate adherence to the schedule listed in paragraph entitled "TAB Submittal and Work Schedule."

1.5.5.1 Contractor

- a. TAB personnel: Ensure that the TAB work is accomplished by a group meeting the requirements specified in paragraph entitled "TAB Personnel Qualification Requirements."
- b. Pre-TAB meeting: Attend the meeting with the TAB Supervisor, and ensure that a representative is present for the sheetmetal contractor, mechanical contractor, electrical contractor, and automatic temperature controls contractor.
- c. HVAC documentation: Furnish one complete set of the following HVAC-related documentation to the TAB agency:
 - (1) Contract drawings and specifications
 - (2) Approved submittal data for equipment
 - (3) Construction work schedule
 - (4) Up-to-date revisions and change orders for the previously listed items
- d. Submittal and work schedules: Ensure that the schedule for submittals and work required by this section and specified in paragraph entitled "TAB Submittal and Work Schedule," is met.
- e. Coordination of supporting personnel:

Provide the technical personnel, such as factory representatives or HVAC controls installer required by the TAB field team to support the TAB field measurement work.

Provide equipment mechanics to operate HVAC equipment and ductwork mechanics to provide the field designated test ports to enable TAB field team to accomplish the TAB field measurement work. Ensure these support personnel are present at the times required by the TAB team, and cause no delay in the TAB field work.

Conversely, ensure that the HVAC controls installer has required support from the TAB team field leader to complete the controls check out.
- f. Deficiencies: Ensure that the TAB Agency supervisor submits all Design/Construction deficiency notifications directly to the Contracting officer within 3 days after the deficiency is encountered. Further, ensure that all such notification submittals are complete with explanation, including documentation, detailing deficiencies.
- g. Prerequisite HVAC work: Complete check out and debugging of HVAC

equipment, ducts, and controls prior to the TAB engineer arriving at the project site to begin the TAB work. Debugging includes searching for and eliminating malfunctioning elements in the HVAC system installations, and verifying all adjustable devices are functioning as designed. Include as prerequisite work items, the deficiencies pointed out by the TAB team supervisor in the design review report.

- h. Prior to the TAB field team's arrival, ensure completion of the applicable inspections and work items listed in the TAB team supervisor's pre-field engineering report. Do not allow the TAB team to commence TAB field work until all of the following are completed.
 - (1) HVAC system installations are fully complete.
 - (2) HVAC prerequisite checkout work lists specified in the paragraph "Pre-Field TAB Engineering Report" are completed, submitted, and approved. Ensure that the TAB Agency gets a copy of the approved prerequisite HVAC work checklist.
 - (3) HVAC system filters are clean for both Season 1 and Season 2 TAB field work.
- i. Advance notice: Furnish to the Contracting Officer with advance written notice for the commencement of the TAB field work.
- j. Insulation work: For required DALT work, ensure that insulation is not installed on ducts to be DALT'd until DALT work on the subject ducts is complete. Later, ensure that openings in duct and machinery insulation coverings for TAB test ports are marked, closed and sealed.

1.5.5.2 TAB Agency

Provide the services of a TAB team which complies with the requirements of paragraph entitled "Independent TAB Agency Personnel Qualifications". The work to be performed by the TAB agency is limited to testing, adjusting, and balancing of HVAC air and water systems to satisfy the requirements of this specification section.

1.5.5.3 TAB Team Supervisor

- a. Overall management: Supervise and manage the overall TAB team work effort, including preliminary and technical TAB procedures and TAB team field work.
- b. Pre-TAB meeting: Attend meeting with Contractor.
- c. Design review report: Review project specifications and accompanying drawings to verify that the air systems and water systems are designed in such a way that the TAB engineer can accomplish the work in compliance with the requirements of this section. Verify the presence and location of permanently installed test ports and other devices needed, including gauge cocks, thermometer wells, flow control devices, circuit setters, balancing valves, and manual volume dampers.
- d. Support required: Specify the technical support personnel required from the Contractor other than the TAB agency; such as factory representatives for temperature controls or for complex equipment. Inform the Contractor in writing of the support personnel needed and when they are needed. Furnish the notice as soon as the need is

anticipated, either with the design review report, or the pre-field engineering report, the during the TAB field work.

- e. Pre-field engineering report: Utilizing the following HVAC-related documentation; contract drawings and specifications, approved submittal data for equipment, up-to-date revisions and change orders; prepare this report.
- f. Prerequisite HVAC work checklist: Ensure the Contractor gets a copy of this checklist at the same time as the pre-field engineering report is submitted.
- g. Technical Assistance for TAB Work: Provide immediate technical assistance to the TAB field team for the TAB work.
 - (1) TAB field visit: At the midpoint of the Season 1 and Season 2 TAB field work effort, visit the contract site to inspect the HVAC installation and the progress of the TAB field work. Conduct site visit full-time for a minimum of one 8 hour workday duration.
 - (2) TAB field visit: Near the end of the TAB field work effort, visit the contract site to inspect the HVAC installation and the progress of the TAB field work. Conduct site visit full-time for a minimum of one 8 hour workday duration. Review the TAB final report data and certify the TAB final report.
- h. Certified TAB report: Certify the TAB report. This certification includes the following work:
 - (1) Review: Review the TAB field data report. From this field report, prepare the certified TAB report.
 - (2) Verification: Verify adherence, by the TAB field team, to the TAB plan prescribed by the pre-field engineering report and verify adherence to the procedures specified in this section.
- i. Design/Construction deficiencies: Within 3 working days after the TAB Agency has encountered any design or construction deficiencies, the TAB Supervisor must submit written notification directly to the Contracting Officer, with a separate copy to the Contractor, of all such deficiencies. Provide in this submittal a complete explanation, including supporting documentation, detailing deficiencies. Where deficiencies are encountered that are believed to adversely impact successful completion of TAB, the TAB Agency must issue notice and request direction in the notification submittal.
- j. TAB Field Check: The TAB team supervisor must attend and supervise Season 1 and and Season 2 TAB field check.

1.5.5.4 TAB Team Field Leader

- a. Field manager: Manage, in the field, the accomplishment of the work specified in Part 3, "Execution."
- b. Full time: Be present at the contract site when TAB field work is being performed by the TAB team; ensure day-to-day TAB team work accomplishments are in compliance with this section.
- c. Prerequisite HVAC work: Do not bring the TAB team to the contract site

until a copy of the prerequisite HVAC Checklist, with all work items certified by the Contractor to be working as designed, reaches the office of the TAB Agency.

1.5.6 Test Reports

1.5.6.1 Certified TAB Reports

Submit: **TAB Report for Season 1** and **TAB Report for Season 2** in the following manner:

- a. Report format: Submit the completed pre-field data forms approved in the pre-field TAB Engineering Report completed by TAB field team, reviewed and certified by the TAB supervisor. Bind the report with a waterproof front and back cover. Include a table of contents identifying by page number the location of each report. Report forms and report data must be typewritten. Handwritten report forms or report data are not acceptable.
- b. Temperatures: On each TAB report form reporting TAB work accomplished on HVAC thermal energy transfer equipment, include the indoor and outdoor dry bulb temperature range and indoor and outdoor wet bulb temperature range within which the TAB data was recorded. Include in the TAB report continuous time versus temperature recording data of wet and dry bulb temperatures for the rooms, or zones, as designated in the following list:
 - (1) Building 59: Rooms 101, 108, 131, 137, 201, 208, 235. Building 60: Rooms 101, 104, 124, 126, 204, 208, 242, 251. Measure and compile data on a continuous basis for the period in which TAB work affecting those rooms is being done.
 - (2) Measure and record data only after the HVAC systems installations are complete, the systems fully balanced and the HVAC systems controls operating in fully automatic mode.
 - (3) Data may be compiled using direct digital controls trend logging where available. Otherwise, temporarily install calibrated time versus temperature/humidity recorders for this purpose. The HVAC systems and controls must be fully operational a minimum of 24 hours in advance of commencing data compilation. Include the specified data in the Season I and Season 2 TAB Report.
- c. System Diagrams: Provide updated diagrams with final installed locations of all terminals and devices, any numbering changes, and actual test locations. Use a key numbering system on the diagram which identifies each outlet contained in the outlet airflow report sheets.
- d. Instruments: List the types of instruments actually used to measure the tab data. Include in the listing each instrument's unique identification number, calibration date, and calibration expiration date.

Instrumentation, used for taking wet bulb temperature readings must provide accuracy of plus or minus 5 percent at the measured face velocities. Submit instrument manufacturer's literature to document instrument accuracy performance is in compliance with that specified.
- e. Certification: Include the typed name of the TAB supervisor and the

dated signature of the TAB supervisor.

- f. Performance Curves: The TAB Supervisor must include, in the TAB Reports, factory pump curves and fan curves for pumps and fans TAB'd on the job.
- g. Calibration Curves: The TAB Supervisor must include, in the TAB Reports, a factory calibration curve for installed flow control balancing valves, flow venturi's and flow orifices TAB'd on the job.

1.6 PROJECT/SITE CONDITIONS

1.6.1 TAB Services to Obtain Existing Conditions

Conduct TAB of the indicated existing systems and equipment and submit the specified TAB reports for approval. Conduct this TAB work in accordance with the requirements of this section.

1.7 SEQUENCING AND SCHEDULING

1.7.1 TAB Submittal and Work Schedule

Comply with additional requirements specified in Appendix C: TAB SUBMITTAL AND WORK SCHEDULE included at the end of this section

1.7.2 Projects with Phased Construction

This specification section is structured as though the HVAC construction, and thereby the TAB work, will be completed in a single phase. When the construction is completed in phases, the TAB work must be planned, completed, and accepted for each construction phase.

1.7.2.1 Phasing of Work

This specification section is structured as though the HVAC construction, and thereby the TAB work, is going to be completed in a single phase. All elements of the TAB work are addressed on this premise. When a contract is to be completed in construction phases, including the TAB work, and the TAB work must be planned for, completed and approved by the Contracting Officer with each phase. An example of this case would be one contract that requires the rehabilitation of the HVAC in each of several separated buildings. At the completion of the final phase, compile all approved reports and submit as one document.

1.7.3 TAB Submittal and Work Schedule

Submit this schedule, and TAB Schematic Drawings, adapted for this particular contract, to the Contracting Officer (CO) for review and approval. Include with the submittal the planned calendar dates for each submittal or work item. Resubmit an updated version for CO approval every 90 calendar days. Compliance with the following schedule is the Contractor's responsibility.

Qualify TAB Personnel: Within 30 calendar days after date of contract award, submit TAB agency and personnel qualifications.

Pre-TAB Meeting: Within 30 calendar days after the date of approval of the TAB agency and personnel, meet with the COTR.

Design Review Report: Within 30 calendar days after the date of the TAB agency personnel qualifications approval, submit design review report.

Pre-Field TAB Engineering Report: Within 21 calendar days after approval of the TAB agency Personnel Qualifications, submit the Pre-Field TAB Engineering Report.

Prerequisite HVAC Work Check Out List For Season 1 and Advanced Notice For Season 1 TAB Field Work: At a minimum of 90 calendar days prior to CCD, submit Season 1 prerequisite HVAC work check out list certified as complete, and submit advance notice of commencement of Season 1 TAB field work.

Season 1 TAB Field Work: At a minimum of 90 calendar days prior to CCD, and when the ambient temperature is within Season 1 limits, accomplish Season 1 TAB field work.

Submit Season 1 TAB Report: Within 15 calendar days after completion of Season 1 TAB field work, submit Season 1 TAB report.

Season 1 TAB Field Check: 30 calendar days after Season 1 TAB report is approved by the Contracting Officer, conduct Season 1 field check.

Complete Season 1 TAB Work: Prior to CCD, complete all TAB work except Season 2 TAB work.

Prerequisite HVAC Work Check Out List For Season 2 and Advanced Notice For Season 2 TAB Field Work: Within 150 calendar days after date of the commencement of the Season 1 TAB field work, submit the Season 2 prerequisite HVAC work check out list certified as complete and submit advance notice of commencement of Season 2 TAB field work.

Season 2 TAB Field Work: Within 210 calendar days after date of commencement of the Season 1 TAB field work and when the ambient temperature is within Season 2 limits, accomplish Season 2 TAB field work.

Submit Season 2 TAB Report: Within 15 calendar days after completion of Season 2 TAB field work, submit Season 2 TAB report.

Season 2 TAB Field Check: 30 calendar days after the Season 2 TAB report is approved by the Contracting Officer, conduct Season 2 field check.

Complete Season 2 TAB Work: Within 15 calendar days after the completion of Season 2 TAB field data check, complete all TAB work.

1.7.3.1 Design Review Report

Submit typed report describing omissions and deficiencies in the HVAC system's design that would preclude the TAB team from accomplishing the duct leakage testing work and the TAB work requirements of this section. Provide a complete explanation including supporting documentation detailing the design deficiency. State that no deficiencies are evident if that is the case.

1.7.3.2 Pre-Field TAB Engineering Report

Submit report containing the following information:

- a. Step-by-step TAB procedure:
- (1) Strategy: Describe the method of approach to the TAB field work from start to finish. Include in this description a complete methodology for accomplishing each seasonal TAB field work session.
 - (2) Air System Diagrams: Use the contract drawings and duct fabrication drawings if available to provide air system diagrams in the report showing the location of all terminal outlet supply, return, exhaust and transfer registers, grilles and diffusers. Use a key numbering system on the diagrams which identifies each outlet contained in the outlet airflow report sheets. Show intended locations of all traverses and static pressure readings.
 - (3) Procedural steps: Delineate fully the intended procedural steps to be taken by the TAB field team to accomplish the required TAB work of each air distribution system and each water distribution system. Include intended procedural steps for TAB work for subsystems and system components.
- b. Pre-field data: Submit AABC or NEBB or SMACNA 1780 data report forms with the following pre-field information filled in:
- (1) Design data obtained from system drawings, specifications, and approved submittals.
 - (2) Notations detailing additional data to be obtained from the contract site by the TAB field team.
 - (3) Designate the actual data to be measured in the TAB field work.
 - (4) Provide a list of the types of instruments, and the measuring range of each, which are anticipated to be used for measuring in the TAB field work. By means of a keying scheme, specify on each TAB data report form submitted, which instruments will be used for measuring each item of TAB data. If the selection of which instrument to use, is to be made in the field, specify from which instruments the choice will be made. Place the instrument key number in the blank space where the measured data would be entered.
- c. Prerequisite HVAC work checkout list: Provide a list of inspections and work items which are to be completed by the Contractor. This list must be acted upon and completed by the Contractor and then submitted and approved by the Contracting Officer prior to the TAB team coming to the contract site.

At a minimum, a list of the applicable inspections and work items listed in the NEBB PROCEDURAL STANDARDS, Section III, "Preliminary TAB Procedures" under paragraphs titled, "Air Distribution System Inspection" and "Hydronic Distribution System Inspection" must be provided for each separate system to be TAB'd.

1.8 SUBCONTRACTOR SPECIAL REQUIREMENTS

Perform all work in this section in accordance with the paragraph entitled "Subcontractor Special Requirements" in Section 01 30 00 ADMINISTRATIVE REQUIREMENTS, stating that all contract requirements of this section must be accomplished directly by a first tier subcontractor. No work may be performed by a second tier subcontractor.

1.9 WARRANTY

Furnish workmanship and performance warranty for the TAB system work performed for a period not less than 1 years from the date of Government acceptance of the work; issued directly to the Government. Include provisions that if within the warranty period the system shows evidence of major performance deterioration, or is significantly out of tolerance, resulting from defective TAB workmanship, the corrective repair or replacement of the defective materials and correction of the defective workmanship is the responsibility of the TAB firm. Perform corrective action that becomes necessary because of defective materials and workmanship while system TAB is under warranty 7 days after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within the specified period of time constitutes grounds for having the corrective action and repairs performed by others and the cost billed to the TAB firm. The Contractor must also provide a 1 year contractor installation warranty.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 WORK DESCRIPTIONS OF PARTICIPANTS

Comply with requirements of this section as specified in Appendix A WORK DESCRIPTIONS OF PARTICIPANTS.

3.2 PRE-TAB MEETING

Meet with the Contracting Officer's technical representative (COTR) to develop a mutual understanding relative to the details of the TAB work requirements. Ensure that the TAB supervisor is present at this meeting. Requirements to be discussed include required submittals, work schedule, and field quality control.

3.3 TAB PROCEDURES

3.3.1 TAB Field Work

Test, adjust, and balance the HVAC systems until measured flow rates (air and water flow) are within plus or minus 5 percent of the design flow rates as specified or indicated on the contract documents.

That is, comply with the the requirements of AABC MN-1 and AABC MN-4, NEBB PROCEDURAL STANDARDS, NEBB MASV, or SMACNA 1780 (TABB) and SMACNA 1858 (TABB), except as supplemented and modified by this section.

Provide instruments and consumables required to accomplish the TAB work. Calibrate and maintain instruments in accordance with manufacturer's written procedures.

Test, adjust, and balance the HVAC systems until measured flow rates (air and water flow) are within plus or minus 5 percent of the design flow rates as specified or indicated on the contract documents. Conduct TAB work, including measurement accuracy, and sound measurement work in conformance with the AABC MN-1 and AABC MN-4, or NEBB TABES and NEBB MASV, or SMACNA

1780 (used by TABB) and SMACNA 1858 sound measurement procedures, except as supplemented and modified by this section. The only water flow and air flow reporting which can be deferred until the Season 2 is that data which would be affected in terms of accuracy due to outside ambient conditions.

3.3.2 Preliminary Procedures

Use the approved pre-field engineering report as instructions and procedures for accomplishing TAB field work. TAB engineer is to locate, in the field, test ports required for testing. It is the responsibility of the sheet metal contractor to provide and install test ports as required by the TAB engineer.

3.3.3 TAB Air Distribution Systems

3.3.3.1 Units With Coils

Report heating and cooling performance capacity tests for hot water, chilled water, DX and steam coils for the purpose of verifying that the coils meet the indicated design capacity. Submit the following data and calculations with the coil test reports:

- a. For air handlers with capacities greater than 7.5 tons (90,000 Btu) cooling, such as factory manufactured units, central built-up units and rooftop units, conduct capacity tests in accordance with AABC MN-4, procedure 3.5, "Coil Capacity Testing."

Do not determine entering and leaving wet and dry bulb temperatures by single point measurement, but by the average of multiple readings in compliance with paragraph 3.5-5, "Procedures", (in subparagraph d.) of AABC MN-4, Procedure 3.5, "Coil Capacity Testing."

Submit part-load coil performance data from the coil manufacturer converting test conditions to design conditions; use the data for the purpose of verifying that the coils meet the indicated design capacity in compliance with AABC MN-4, Procedure 3.5, "Coil Capacity Testing," paragraph 3.5.7, "Actual Capacity Vs. Design Capacity" (in subparagraph c.).

- b. For units with capacities of 7.5 tons (90,000 Btu) or less, such as fan coil units, duct mounted reheat coils associated with VAV terminal units, and unitary units, such as through-the-wall heat pumps:

Determine the apparent coil capacity by calculations using single point measurement of entering and leaving wet and dry bulb temperatures; submit the calculations with the coil reports.

3.3.3.2 Air Handling Units

Air handling unit systems including fans (air handling unit fans, exhaust fans and winter ventilation fans), coils, ducts, plenums, mixing boxes, terminal units, variable air volume boxes, and air distribution devices for supply air, return air, outside air, mixed air relief air, and makeup air.

3.3.3.3 Heating and Ventilating Units

Heating and ventilating unit systems including fans, coils, ducts, plenums, roof vents, registers, diffusers, grilles, and louvers for supply air, return air, outside air, and mixed air.

3.3.3.4 Fan Coils

Fan coil unit systems including fans, coils, ducts, plenums, and air distribution devices for supply air, return air, and outside air.

3.3.3.5 Exhaust Fans

Exhaust fan systems including fans, ducts, plenums, grilles, and hoods for exhaust air.

3.3.4 TAB Water Distribution Systems

3.3.4.1 Chilled Water

Chilled water systems including chillers, condensers, cooling towers, pumps, coils, system balance valves and flow measuring devices.

For water chillers, report data as required by AABC, NEBB and TABB standard procedures, including refrigeration operational data.

3.3.4.2 Heating Hot Water

Heating hot water systems including boilers, hot water converters (e.g., heat exchangers), pumps, coils, system balancing valves and flow measuring devices.

3.3.5 TAB Work on Performance Tests With Seasonal Limitations

3.3.5.1 Performance Tests

Accomplish proportionate balancing TAB work on the air distribution systems and water distribution systems, in other words, accomplish adjusting and balancing of the air flows and water flows, any time during the duration of this contract, subject to the limitations specified elsewhere in this section. However, accomplish, within the following seasonal limitations, TAB work on HVAC systems which directly transfer thermal energy.

3.3.5.2 Season Of Maximum Load

Visit the contract site for at least two TAB work sessions for TAB field measurements. Visit the contract site during the season of maximum heating load and visit the contract site during the season of maximum cooling load, the goal being to TAB the operational performance of the heating systems and cooling systems under their respective maximum outdoor environment-caused loading. During the seasonal limitations, TAB the operational performance of the heating systems and cooling systems.

3.3.5.3 Ambient Temperatures

On each tab report form used for recording data, record the outdoor and indoor ambient dry bulb temperature range and the outdoor and indoor ambient wet bulb temperature range within which the report form's data was recorded. Record these temperatures at beginning and at the end of data taking.

3.3.5.4 Water Chillers

Water chillers: For water chillers, report data as required by NEBB Form

TAB 15-83, NEBB PROCEDURAL STANDARDS, including refrigeration operational data.

3.3.5.5 Coils

Report heating and cooling performance capacity tests for hot water, chilled water, and steam coils for the purpose of verifying that the coils meet the indicated design capacity. Submit the following data and calculations with the coil test reports:

- a. For Central station air handlers with capacities greater than 7.5 tons (90,000 Btu) cooling, such as factory manufactured units, central built-up units and rooftop units, conduct capacity tests in accordance with AABC MN-4, procedure 3.5, "Coil Capacity Testing."

Entering and leaving wet and dry bulb temperatures are not determined by single point measurement, but by the average of multiple readings in compliance with paragraph 3.5-5, "Procedures", (in subparagraph d.) of AABC MN-4, Procedure 3.5, "Coil Capacity Testing."

Submit part-load coil performance data from the coil manufacturer converting test conditions to design conditions; use the data for the purpose of verifying that the coils meet the indicated design capacity in compliance with AABC MN-4, Procedure 3.5, "Coil Capacity Testing," paragraph 3.5.7, "Actual Capacity Vs. Design Capacity" (in subparagraph c.).

- b. For units with capacities of 7.5 tons (90,000 Btu) or less, such as fan coil units, duct mounted reheat coils associated with VAV terminal units, and unitary units, such as through-the-wall heat pumps:

Determine the apparent coil capacity by calculations using single point measurement of entering and leaving wet and dry bulb temperatures; submit the calculations with the coil reports.

3.3.6 Workmanship

Conduct TAB work on the HVAC systems until measured flow rates are within plus or minus 5 percent of the design flow rates as specified or indicated on the contract documents. This TAB work includes adjustment of balancing valves, balancing dampers, and sheaves. Further, this TAB work includes changing out fan sheaves and pump impellers if required to obtain air and water flow rates specified or indicated. If, with these adjustments and equipment changes, the specified or indicated design flow rates cannot be attained, contact the Contracting Officer for direction.

3.3.7 Deficiencies

Strive to meet the intent of this section to maximize the performance of the equipment as designed and installed. However, if deficiencies in equipment design or installation prevent TAB work from being accomplished within the range of design values specified in the paragraph entitled "Workmanship," provide written notice as soon as possible to the Contractor and the Contracting Officer describing the deficiency and recommended correction.

Responsibility for correction of installation deficiencies is the Contractor's. If a deficiency is in equipment design, call the TAB team supervisor for technical assistance. Responsibility for reporting design

deficiencies to Contractor is the TAB team supervisor's.

3.3.8 TAB Reports

Additional requirements for TAB Reports are specified in Appendix B
REPORTS - TAB

After completion of the TAB field work, prepare the TAB field data for TAB supervisor's review and certification, using the reporting forms approved in the pre-field engineering report. Data required by those approved data report forms is to be furnished by the TAB team. Except as approved otherwise in writing by the Contracting Officer, the TAB work and thereby the TAB report is considered incomplete until the TAB work is accomplished to within the accuracy range specified in the paragraph entitled "Workmanship."

3.3.9 Quality Assurance - COTR TAB Field Acceptance Testing

3.3.9.1 TAB Field Acceptance Testing

During the field acceptance testing, verify, in the presence of the COTR, random selections of data (water, air quantities, air motion, recorded in the TAB Report. Points and areas for field acceptance testing are to be selected by the COTR. Measurement and test procedures are the same as approved for TAB work for the TAB Report.

Field acceptance testing includes verification of TAB Report data recorded for the following equipment groups:

Group 1: All chillers, boilers, return fans, computer room units, and air handling units (rooftop and central stations).

Group 2: 25 percent of the VAV terminal boxes and associated diffusers and registers.

Group 3: 25 percent of the supply diffusers, registers, grilles associated with constant volume air handling units.

Group 4: 25 percent of the return grilles, return registers, exhaust grilles and exhaust registers.

Group 5: 25 percent of the supply fans, exhaust fans, and pumps.

Further, if any data on the TAB Report for Groups 2 through 5 is found not to fall within the range of plus 5 to minus 5 percent of the TAB Report data, additional group data verification is required in the presence of the COTR. Verify TAB Report data for one additional piece of equipment in that group. Continue this additional group data verification until out-of-tolerance data ceases to be found.

3.3.9.2 Additional COTR TAB Field Acceptance Testing

If any of the acceptance testing measurements for a given equipment group is found not to fall within the range of plus 5 to minus 5 percent of the TAB Report data, terminate data verification for all affected data for that group. The affected data for the given group will be disapproved. Make the necessary corrections and prepare a revised TAB Report. Reschedule acceptance testing of the revised report data with the COTR.

Further, if any data on the TAB Report for a given field acceptance test group is out-of-tolerance, then field test data for one additional field

test group as specified herein. Continue this increase field test work until out-of-tolerance data ceases to be found. This additional field testing is up and above the original 25 percent of the of reported data entries to be field tested.

If there are no more similar field test groups from which to choose, additional field testing from another, but different, type of field testing group must be tested.

3.3.9.3 Prerequisite for Approval

Compliance with the field acceptance testing requirements of this section is a prerequisite for the final Contracting Officer approval of the TAB Report submitted.

3.4 MARKING OF SETTINGS

Upon the final TAB work approval, permanently mark the settings of HVAC adjustment devices including valves, gauges, splitters, and dampers so that adjustment can be restored if disturbed at any time. Provide permanent markings clearly indicating the settings on the adjustment devices which result in the data reported on the submitted TAB report.

3.5 MARKING OF TEST PORTS

The TAB team is to permanently and legibly mark and identify the location points of the duct test ports. If the ducts have exterior insulation, make these markings on the exterior side of the duct insulation. Show the location of test ports on the as-built mechanical drawings with dimensions given where the test port is covered by exterior insulation.

3.6 APPENDICES

Appendix A WORK DESCRIPTIONS OF PARTICIPANTS
Appendix B REPORTS - TAB
Appendix C TAB SUBMITTAL AND WORK SCHEDULE
Appendix D REQUIREMENTS FOR DUCT AIR LEAK TESTING

Appendix A

WORK DESCRIPTIONS OF PARTICIPANTS

The Contractor is responsible for ensuring compliance with all requirements of this specification section. However, the following delineation of specific work items is provided to facilitate and co-ordinate execution of the various work efforts by personnel from separate organizations.

1. Contractor
 - a. HVAC documentation: Provide pertinent contract documentation to the TAB Firm, to include the following: the contract drawings and specifications; copies of the approved submittal data for all HVAC equipment, air distribution devices, and air/water measuring/balancing devices; the construction work schedule; and other applicable documents requested by the TAB Firm. Provide the TAB Firm copies of contract revisions and modifications as they occur.
 - b. Schedules: Ensure the requirements specified under the paragraph "TAB Schedule" are met.
 - c. Pre-TAB meeting: Arrange and conduct the Pre-TAB meeting. Ensure that a representative is present for the sheet metal contractor, the mechanical contractor, the electrical contractor, and the automatic temperature controls contractor.
 - d. Coordinate Support: Provide and coordinate support personnel required by the TAB Firm in order to accomplish the TAB field work. Support personnel may include factory representatives, HVAC controls installers, HVAC equipment mechanics, sheet metal workers, pipe fitters, and insulators. Ensure support personnel are present at the work site at the times required.
 - e. Correct Deficiencies: Ensure the notifications of Construction Deficiencies are provided as specified herein. Refer to the paragraph entitled "Construction Deficiencies." Correct each deficiency as soon as practical with the Contracting Officer, and submit revised schedules and other required documentation.
 - f. Pre-TAB Work Checklists: Complete check out and debugging of HVAC equipment, ducts, and controls prior to the TAB engineer arriving at the project site to begin the TAB work. Debugging includes searching for and eliminating malfunctioning elements in the HVAC system installations, and verifying all adjustable devices are functioning as designed. Include as pre-TAB work checklist items, the deficiencies pointed out by the TAB team supervisor in the design review report.

Prior to the TAB field team's arrival, ensure completion of the applicable inspections and work items listed in the TAB team supervisor's TAB Work Procedures Summary. Do not allow the TAB team to commence TAB field work until all of the following are completed.

- g. Give Notice of Testing: Submit advance notice of TAB field work accompanied by completed prerequisite HVAC Work List
2. TAB Team Supervisor

- a. Overall management: Supervise and manage the overall TAB team work effort, including preliminary and technical TAB procedures and TAB team field work.
- b. Schedule: Ensure the requirements specified under the paragraph "TAB Schedule" are met.
- c. Submittals: Provide the submittals specified herein.
- d. Pre-TAB meeting: Attend meeting with Contractor. Ensure TAB personnel that will be involved in the TAB work under this contract attend the meeting.
- e. Design Review Report: Submit typed report describing omissions and deficiencies in the HVAC system's design that would preclude the TAB team from accomplishing the duct leakage testing work and the TAB work requirements of this section. Provide a complete explanation including supporting documentation detailing the design deficiency. State that no deficiencies are evident if that is the case.
- f. Support required: Specify the technical support personnel required from the Contractor other than the TAB agency; such as factory representatives for temperature controls or for complex equipment. Inform the Contractor in writing of the support personnel needed and when they are needed. Furnish the notice as soon as the need is anticipated, either with the design review report, or the TAB Procedures Summary, the during the TAB field work.

Ensure the Contractor is properly notified and aware of all support personnel needed to perform the TAB work. Maintain communication with the Contractor regarding support personnel throughout the duration of the TAB field work, including the TAB field acceptance testing checking.

Ensure all inspections and verifications for the Pre-Final TAB Checklists are completely and successfully conducted before TAB field work is performed.

- g. Technical Assistance: Provide technical assistance to the TAB field work.
 - h. Deficiencies Notification: Ensure the notifications of Construction Deficiencies are provided as specified herein. Comply with requirements of the paragraph entitled "Construction Deficiencies." Resolve each deficiency as soon as practical and submit revised schedules and other required documentation.
 - i. Procedures: Develop the required TAB procedures for systems or system components not covered in the TAB Standard.
3. TAB Team Field Leader
 - a. Field manager: Manage, in the field, the accomplishment of the work specified in Part 3, "Execution."
 - b. Full time: Be present at the contract site when TAB field work is being performed by the TAB team; ensure day-to-day TAB team work accomplishments are in compliance with this section.
 - c. Prerequisite HVAC work: Do not bring the TAB team to the contract site

until a copy of the prerequisite HVAC work list, with all work items certified by the Contractor to be working as designed, reaches the office of the TAB Agency.

Appendix B

REPORTS - TAB

All submitted documentation must be typed, neat, and organized. All reports must have a waterproof front and back cover, a title page, a certification page, sequentially numbered pages throughout, and a table of contents. Tables, lists, and diagrams must be titled. Generate and submit for approval the following documentation:

1. TAB Work Execution Schedule

Submit a detailed schedule indicating the anticipated calendar date for each submittal and each portion of work required under this section. For each work entry, indicate the support personnel (such as controls provider, HVAC mechanic, etc.) that are needed to accomplish the work. Arrange schedule entries chronologically.

2. TAB Procedures Summary

Submit a detailed narrative describing all aspects of the TAB field work to be performed. Clearly distinguish between TAB information. Include the following:

- a. A list of the intended procedural steps for the TAB field work from start to finish. Indicate how each type of data measurement will be obtained. Include what Contractor support personnel are required for each step, and the tasks they need to perform.
- b. A list of the project's submittals that are needed by the TAB Firm in order to meet this Contract's requirements.
- c. The schematic drawings to be used in the required reports, which may include building floor plans, mechanical room plans, duct system plans, and equipment elevations. Indicate intended TAB measurement locations, including where test ports need to be provided by the Contractor.
- d. The data presentation forms to be used in the report, with the preliminary information and initial design values filled in.
- e. A list of TAB instruments to be used, edited for this project, to include the instrument name and description, manufacturer, model number, scale range, published accuracy, most recent calibration date, and what the instrument will be used for on this project.
- f. A thorough checklist of the work items and inspections that need to be accomplished before the Season 1 TAB field work can be performed. The Contractor must complete, submit, and receive approval of the **Completed Season 1 Pre-TAB Work Checklist** before the Season 1 TAB field work can be accomplished.
- g. The checklists specified above shall be individually developed and tailored specifically for the work under this contract. Refer to **NEBB PROCEDURAL STANDARDS**, Section III, "Preliminary TAB Procedures" under the paragraphs titled, "Air Distribution System Inspection" and "Hydronic Distribution System Inspection" for examples of items to include in the checklists.

3. Design Review Report

Submit report containing the following information:

- a. Review the contract specifications and drawings to verify that the TAB work can be successfully accomplished in compliance with the requirements of this section. Verify the presence and location of permanently installed test ports and other devices needed, including gauge cocks, thermometer wells, flow control devices, circuit setters, balancing valves, and manual volume dampers.
 - b. Submit a typed report describing omissions and deficiencies in the HVAC system's design that would preclude the TAB team from accomplishing the TAB work requirements of this section. Provide a complete explanation including supporting documentation detailing the design deficiency. If no deficiencies are evident, state so in the report.
4. TAB Reports: Submit TAB Report for Season 1 and TAB Report for Season 2 in the following manner:
- a. Procedure Summary: Submit a copy of the approved TAB Procedures Summary. When applicable, provide notations describing how actual field procedures differed from the procedures listed.
 - b. Report format: Submit the completed data forms approved in the pre-field TAB Engineering Report completed by TAB field team, reviewed, approved and signed by the TAB supervisor. Bind the report with a waterproof front and back cover. Include a table of contents identifying by page number the location of each report. Report forms and report data shall be typewritten. Handwritten report forms or report data are not acceptable.
 - c. Temperatures: On each TAB report form reporting TAB work accomplished on HVAC thermal energy transfer equipment, include the indoor and outdoor dry bulb temperature range and indoor and outdoor wet bulb temperature range within which the TAB data was recorded. Include in the TAB report continuous time versus temperature recording data of wet and dry bulb temperatures for the rooms, or zones, as designated in the following list:

Building 59: Rooms 101, 108, 131, 137, 201, 208, 235.
Building 60: Rooms 101, 104, 124, 126, 204, 208, 242, 251.
- (1) Data shall be measured and compiled on a continuous basis for the period in which TAB work affecting those rooms is being done.
 - (2) Data shall be measured/recorded only after the HVAC systems installations are complete, the systems fully balanced and the HVAC systems controls operating in fully automatic mode. Provide a detailed explanation wherever a final measurement did not achieve the required value.
 - (3) Data may be compiled using direct digital controls trend logging where available. Otherwise, the Contractor shall temporarily install calibrated time versus temperature/humidity recorders for this purpose. The HVAC systems and controls shall have been fully operational a minimum of 24 hours in advance of commencing data compilation. The specified data shall be included in the Season I

TAB Report Season I and Season 2 TAB Report.

- d. Air System Diagrams: Provided updated diagrams with final installed locations of all terminals and devices, any numbering changes, and actual test locations.
- e. Instruments: List the types of instruments actually used to measure the tab data. Include in the listing each instrument's unique identification number, calibration date, and calibration expiration date.

Instrumentation, used for taking wet bulb temperature readings shall provide accuracy of plus or minus 5 percent at the measured face velocities. Submit instrument manufacturer's literature to document instrument accuracy performance is in compliance with that specified.

- f. Performance Curves: The TAB Supervisor shall include, in the TAB Reports, factory pump curves and fan curves for pumps and fans TAB'd on the job.
- g. Calibration Curves: The TAB Supervisor shall include, in the TAB Reports, a factory calibration curve for installed flow control balancing valves, flow venturis and flow orifices TAB'd on the job.
- h. Data From TAB Field Work: After completion of the TAB field work, prepare the TAB field data for TAB supervisor's review and approval signature, using the reporting forms approved in the pre-field engineering report. Data required by those approved data report forms shall be furnished by the TAB team. Except as approved otherwise in writing by the Contracting Officer, the TAB work and thereby the TAB report shall be considered incomplete until the TAB work is accomplished to within the accuracy range specified in the paragraph entitled "Workmanship."

Appendix C

TAB SUBMITTAL AND WORK SCHEDULE

Perform the following items of work in the order listed adhering to the dates schedule specified below. Include the major items listed in this schedule in the project network analysis schedule required by Section 01 32 17.00 20 NETWORK ANALYSIS SCHEDULES (NAS).

Submit TAB Agency and TAB Personnel Qualifications: Within 30 calendar days after date of contract award.

Submit the TAB Work Execution Schedule: within 14 days after receipt of the TAB agency and TAB personnel qualifications approval. Revise and re-submit this schedule 28 days prior to commencement of TAB Season 1 work and TAB Season 2 work.

Submit the TAB Work Procedures Summary: within 14 days after receipt of the initial approved TAB Work Execution Schedule.

Meet with the COTR at the Pre-TAB Meeting: Within 28 calendar days after receipt of the approved initial TAB Execution Schedule.

Submit Design Review Report: Within 30 calendar days after the receipt of the approved initial TAB Work Execution Schedule.

Conduct measurements and submit the Record of Existing Facility Conditions: within 28 days after receipt of approved TAB Work Procedures Summary.

Advance Notice of Season 1 TAB Field Work: At a minimum of 14 calendar days prior to Season 1 TAB Field Work, submit advance notice of TAB field work accompanied by completed Season 1 Pre-TAB Work Checklist.

Season 1 TAB Field Work: At a minimum of 90 calendar days prior to CCD, and when the ambient temperature is within Season 1 limits, accomplish Season 1 TAB field work.

Submit Season 1 TAB Report: Within 15 calendar days after completion of Season 1 TAB field work, submit initial Season 1 TAB report.

Season 1 Quality Assurance - COTR TAB Field Check: 30 calendar days after initial Season 1 TAB report is approved by the Contracting Officer, conduct Season 1 field check.

Complete Season 1 TAB Work: Prior to CCD, complete all TAB work except Season 2 TAB work and submit final.

Receive the approved TAB report: Within 21 calendar days, receive the report from Contracting Officer approved TAB report.

Advance Notice of Season 2 TAB Field Work: At a minimum of 126 calendar days after CCD, submit advance notice of Season 2 TAB field work accompanied by completed Season 2 Pre-TAB Work Checklist.

Season 2 TAB Field Work: Within 84 calendar days after date of advance notice of Season 2 TAB field work and when the ambient temperature is within Season 2 limits, accomplish Season 2 TAB field work.

Submit Season 2 TAB Report: Within 15 calendar days after completion of Season 2 TAB field work, submit Season 2 TAB report.

Season 2 Quality Assurance - COTR TAB Field Checks: 28 calendar days after the Season 2 TAB report is approved by the Contracting Officer, conduct Season 2 field check.

Complete Season 2 TAB Work: Within 15 calendar days after the completion of Season 2 TAB field data check, complete all TAB work.

Receive the approved TAB report: Within calendar 21 days, receive the report from Contracting Officer.

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Replace Chiller Buildings 59 & 60

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH
		23 05 93	SD-01 Preconstruction Submittals														
			Records of Existing Conditions	1.3													
			Records of Existing Conditions	1.3.3													
			TAB Firm	1.5.4.1													
			TAB team assistants	1.2													
			TAB team engineer	1.2													
			TAB Specialist	1.5.4.2													
			TAB team field leader	1.2													
			SD-02 Shop Drawings														
			TAB Schematic Drawings and Report Forms	1.3.3													
			SD-03 Product Data														
			Equipment and Performance Data	1.3													
			TAB Related HVAC Submittals	1.5.4.4													
			TAB Procedures	1.5.2													
			Calibration	1.5.2													
			Systems Readiness Check	1.3.3													
			TAB Execution	1.5.5													
			TAB Verification														
			SD-06 Test Reports														
			TAB Work Execution Schedule	3.6													
			TAB Procedures Summary	3.6													
			Design review report	1.3.3													
			Design review report	1.7.3.1													
			Design review report	3.6													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Replace Chiller Buildings 59 & 60

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		MAILED TO CONTR/	DATE RCD FRM APPR AUTH
		23 05 93	TAB report for Season 1	1.5.6.1														
			TAB report for Season 1	3.6														
			TAB report for Season 2	1.5.6.1														
			TAB report for Season 2	3.6														
			SD-07 Certificates															
			Independent TAB agency and personnel qualifications	1.5.1														
			Independent TAB agency and personnel qualifications	1.5.1														
			Advance Notice of Season TAB Field Work															
			Completed Season 1 Pre-TAB Work Checklist	3.6														
			Completed Season 1 Pre-TAB Work Checklist	3.6														
			TAB Firm	1.5.4.1														
			TAB Submittal and Work Schedule	1.7.1														
			TAB Submittal and Work Schedule	1.7.3														
			Design review report	1.3.3														
			Design review report	1.7.3.1														
			Design review report	3.6														
			Pre-field TAB engineering report	1.7.3.2														
			Prerequisite HVAC Work Check Out List For Season 1	1.7.3														

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
Replace Chiller Buildings 59 & 60

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	A C T I O N C O D E	DATE OF A C T I O N	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	A C T I O N C O D E			DATE OF A C T I O N
		23 05 93	Prerequisite HVAC Work Check Out List For Season 2	1.7.3													

AS BUILT CONDITIONS

SATISFACTORY TO AROICC:	DATE
SATISFACTORY TO INSPECTOR:	8-25-0
DATE	
CONTRACTOR	

?
see OR 16 A-3
what is solid outside
limits of this drawing?

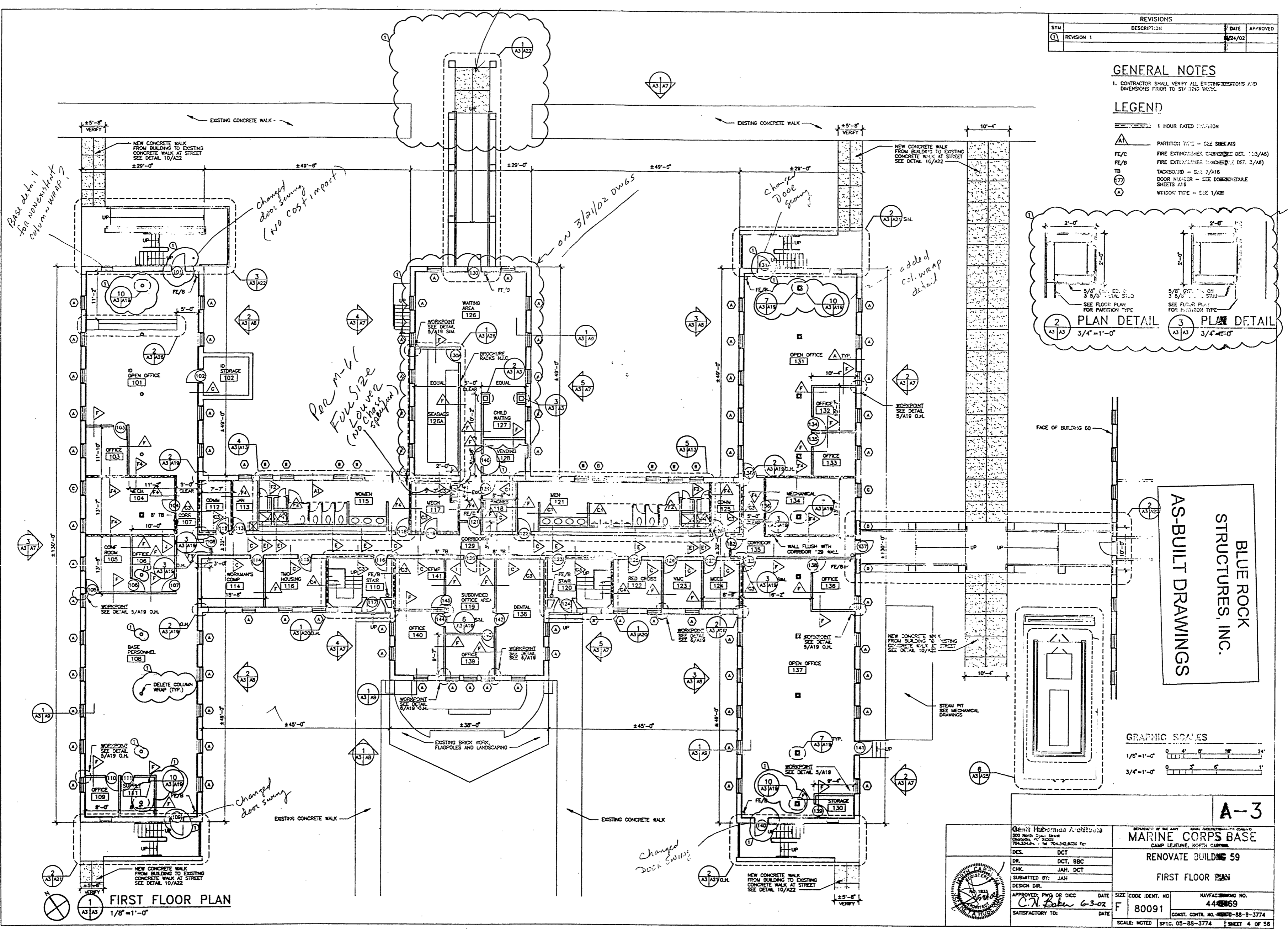
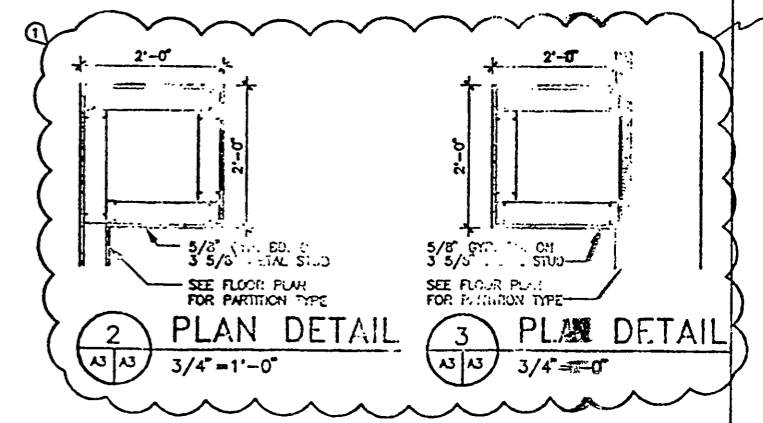
REV	DESCRIPTION	DATE	APPROVED
1	REVISION 1	8/24/02	

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO STARTING WORK.

LEGEND

- 1 HOUR RATED CURTAIN
- △ PARTITION WALL - SEE SHEET A18
- FE/C FIRE EXTINGUISHER CABINET DET. 103/A8
- FE/B FIRE EXTINGUISHER CABINET DET. 5/A8
- TB TACKED TO - SEE 5/A16
- ⊙ DOOR NUMBER - SEE DISCRETE SHEETS A16
- ⊙ WINDOW TYPE - SEE 1/A2



Base of col. 1
for water tank
column in room 101

Changed door swing
(No cost impact)

on 3/21/02 DWG

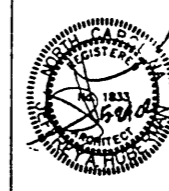
Changed door swing

added col. wrap detail

Room size
Five size
(no change spacing)

Changed door swing

Changed door swing



GENL. HUBBARD & ASSOCIATES 100 MAIN ST. SUITE 200 WASHINGTON, DC 20004-4400 TEL: 202-638-6300 FAX: 202-638-6301		U.S. DEPARTMENT OF THE ARMY MARINE CORPS BASE CAMP LEJUNE, MARYLAND	
DR. DCT, BBC CHK. JAH, DCT SUBMITTED BY: JAH DESIGN DIR.		RENOVATE BUILDING 59 FIRST FLOOR PLAN	
APPROVED: PWD OR DICC C.N. Baker 6-3-02 SATISFACTORY TO:	DATE: 6-3-02	SIZE: F CODE: 80091	NAVFAC DRAWING NO.: 44-88869 CONST. CONTR. NO.: 88869-88-3774 SCALE: NOTED SPEC. 05-88-3774 3 SHEET 4 OF 56

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
1	MOVEMENT 0003	8/15/02	
2	REVISION 1	8/24/02	

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO STARTING WORK.

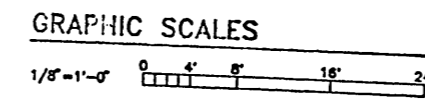
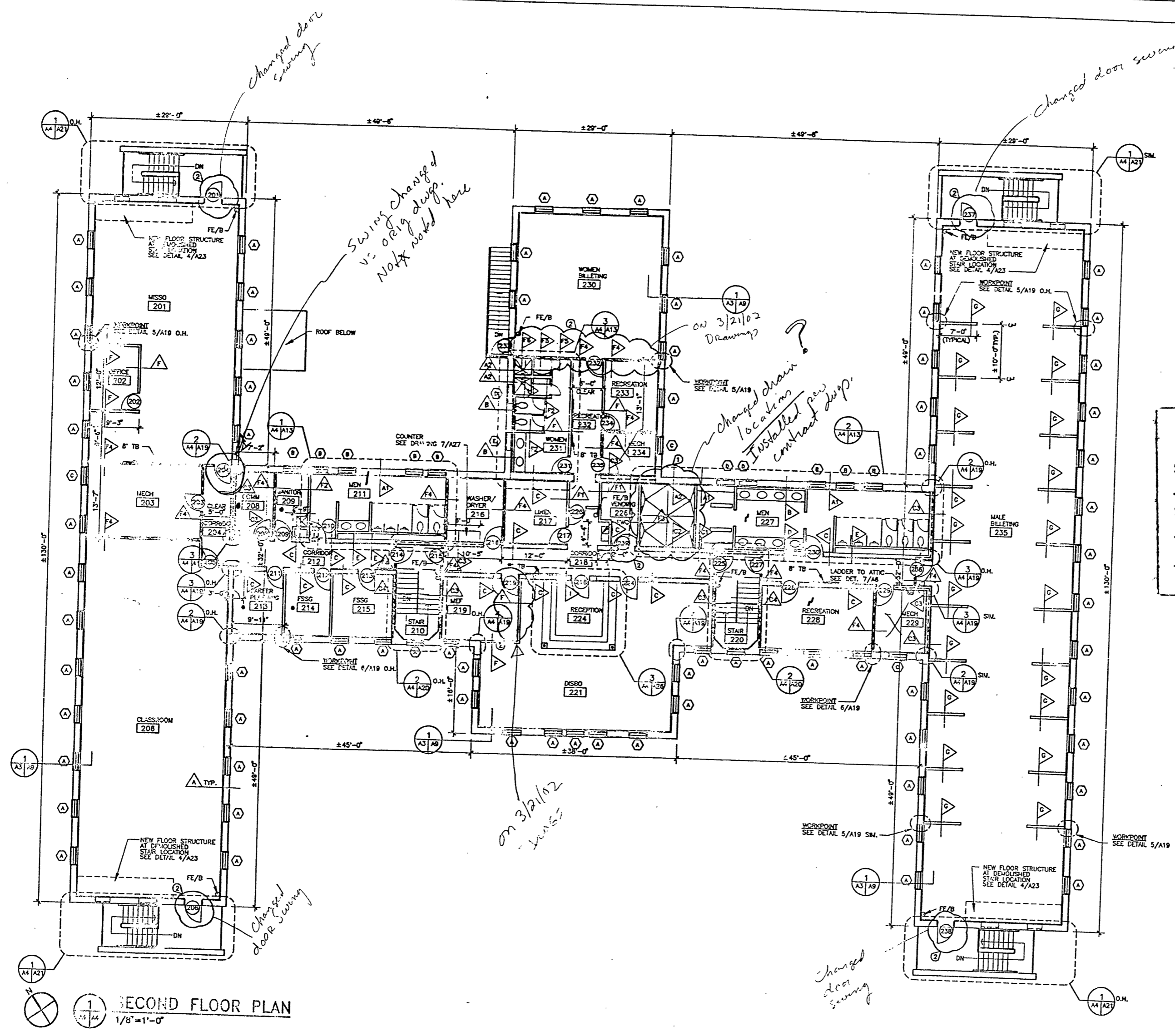
LEGEND

- 1 HOUR RATED PARTITION
- ▲ PARTITION TYPE - SEE SHEET A19
- FE/C FIRE EXTINGUISHER CABINET (SEE DET. 4A5/A45)
- FE/B FIRE EXTINGUISHER BRACKET (SEE DET. 3/A45)
- TB TACKBOARD - SEE 3/A18
- DOOR NUMBER - SEE DOOR SCHEDULE SHEETS A18
- WINDOW TYPE - SEE 1/A18

AS BUILT CONDITIONS

SATISFACTORY TO AROICC:	DATE
SATISFACTORY TO INSPECTOR:	8-25-02
	DATE
CONTRACTOR	

BLUE ROCK STRUCTURES, INC.
AS-BUILT DRAWINGS



Grant Huberman Architects 500 North Tryon Street Charlotte, NC 28202 704.334.4458 Fax 704.342.8639		A-4	
		MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA RENOVATE BUILDING 59 SECOND FLOOR PLAN	
DES. DCT CHK. DCT, BBC SUBMITTED BY: JAH, DCT DESIGN DR.	APPROVED: P/O OR OIC DATE <i>C.H. Baker</i> 6-3-02	SIZE CODE IDENT. NO F 80091	NAVFAC DRAWING NO. 4448470 CONST. CONTR. NO. NS2470-88-3774 SCALE: NOTED SPEC. 05-88-3774 SHEET 5 OF 58

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
1	REVISION 0001	5/24/02	
2	REVISION 0002	12/31/02	

NOTE:
PROVIDE FIRESTOPPING THROUGH ALL RATED WALLS
AND FLOORS IN ACCORDANCE WITH SPECIFICATION

AS BUILT CONDITIONS	
SATISFACTORY TO AROICC:	DATE
SATISFACTORY TO INSPECTOR:	DATE
CONTRACTOR	

VAV's 4+8
REMOVED

30' 10" X 8' PRECAST CONCRETE UTILITY STRUCTURE
MINIMUM 4000 PSI CONCRETE. STRUCTURE SHALL MEET
ASTM C858 UNDERGROUND PRECAST CONCRETE UTILITY
STRUCTURE. PROVIDE GRADE 60 RE-BAR MEETING THE
REQUIREMENTS OF ASTM A615. PROVIDE EXTRA RE-BAR
AT OPENINGS. ALL JOINTS TO BE SEALED

Gantt Huberman Architects
800 North Tryon Street
Charlotte, NC 28202
704.334.8436 Tel 704.342.9639 Fax

DES. MSW
DR. MSW
CHK. MSW
SUBMITTED BY: JAH
DESIGN DIR.
APPROVED: PWO OR OICC DATE

SATISFACTORY TO: DATE

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

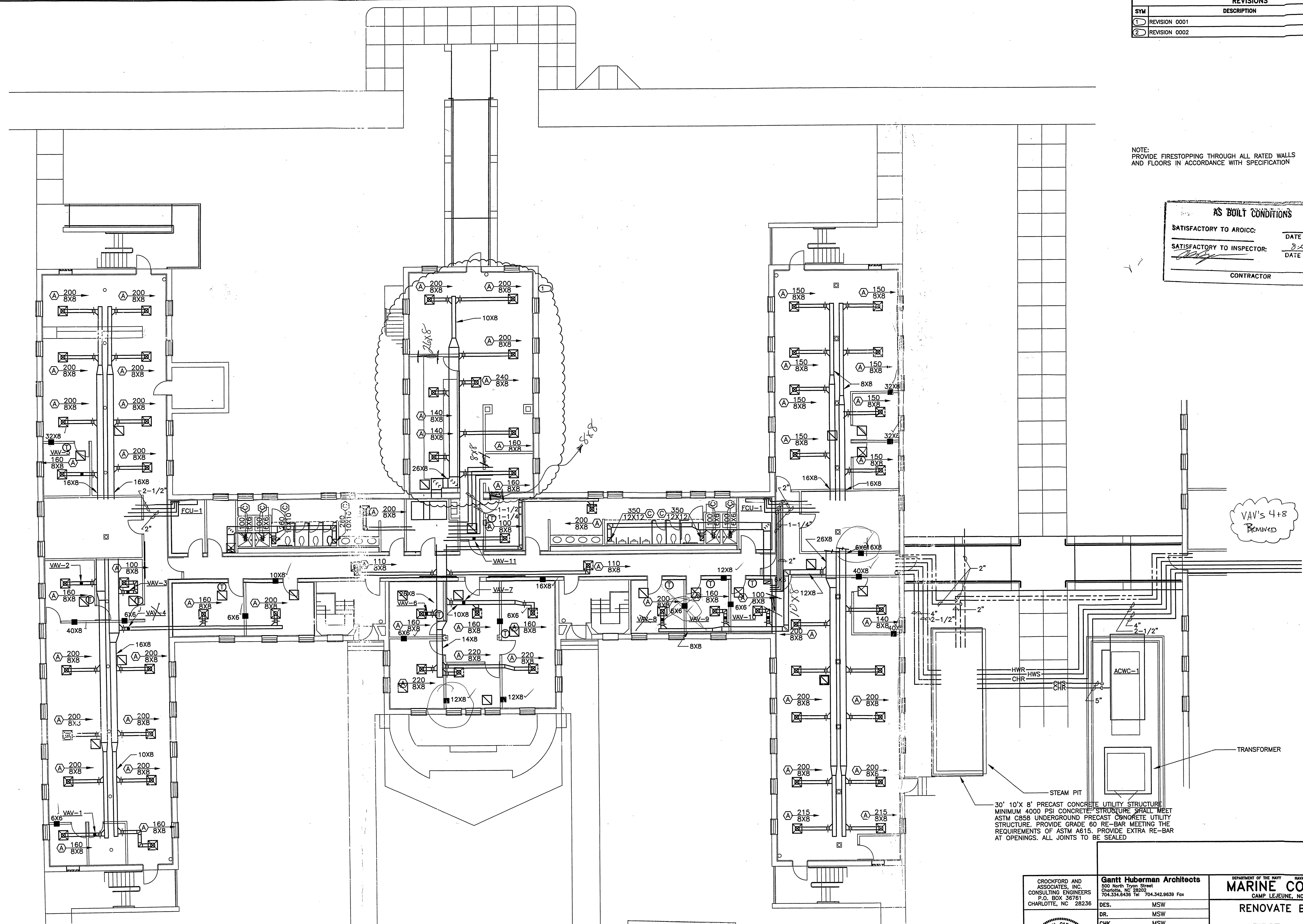
RENOVATE BUILDING 59

**FIRST FLOOR PLAN
HVAC**

NAVAFAC DRAWING NO.
4448503

CONST. CONTR. NO. N62470-88-B-3774

SCALE: NOTED SPEC. 05-88-3774 SHEET 38 OF 55



FIRST FLOOR PLAN
SCALE: 1/8" = 1'-0"

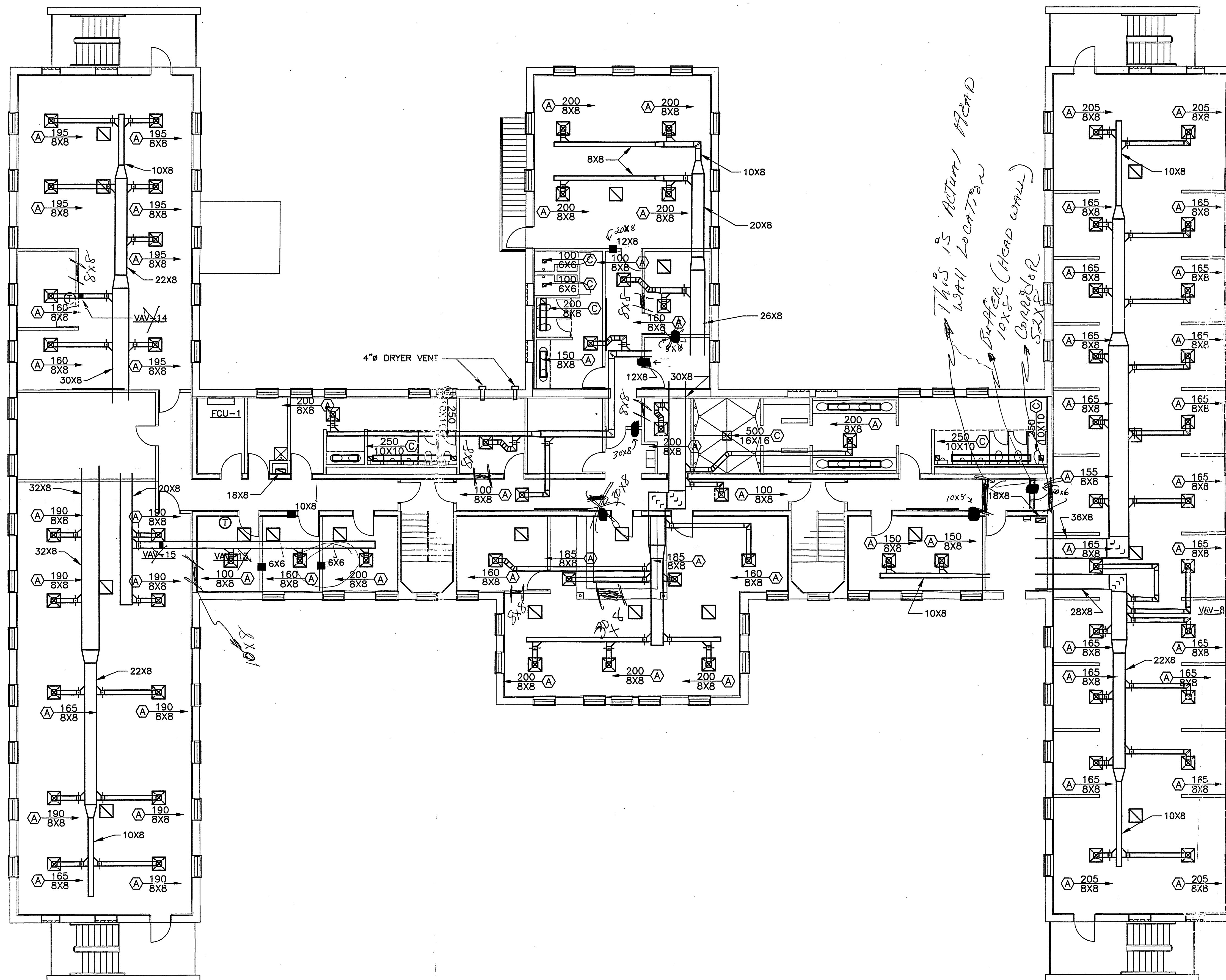
BLUE ROCK
STRUCTURES, INC.
AS-BUILT DRAWINGS

GRAPHIC SCALES
1/8"=1'-0" 4' 8' 16' 24'



M-4

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
2	REVISION 0002	12/31/02	



AS BUILT CONDITIONS

SATISFACTORY TO ARCHITECT: _____ DATE _____

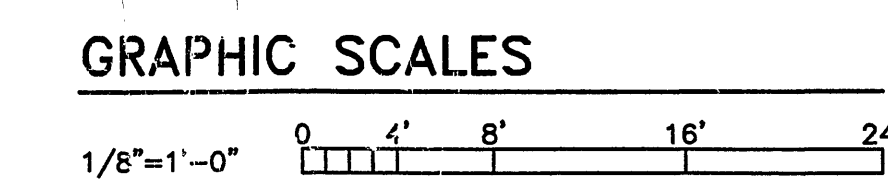
SATISFACTORY TO INSPECTOR: *P. J. F. 13* DATE _____

CONTRACTOR _____

VAV's 13, 14, 15
Removed

SECOND FLOOR PLAN
SCALE: 1/8" = 1'-0"

BLUE ROCK
STRUCTURES, INC.
AS-BUILT DRAWINGS



CROCKFORD AND ASSOCIATES, INC. 300 North Tryon Street Charlotte, NC 28202 P.O. BOX 36761 CHARLOTTE, NC 28236		Gantt Huberman Architects 300 North Tryon Street Charlotte, NC 28202 704.334.6436 Tel 704.342.9639 Fax		M-5	
DES. MAA		DR. MAA		MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA	
CHK. JGR		SUBMITTED BY: JAH		RENOVATE BUILDING 59	
DESIGN DIR.		APPROVED: PWO OR OICC		SECOND FLOOR PLAN HVAC	
DATE		DATE		NAVFAC DRAWING NO. 4448504	
SATISFACTORY TO:		DATE		CONST. CONTR. NO. N62470-88-B-3774	
SIZE F		CODE IDENT. NO. 80091		SHEET 39 OF 56	
SCALE: NOTED		SPEC. 05-86-3774			

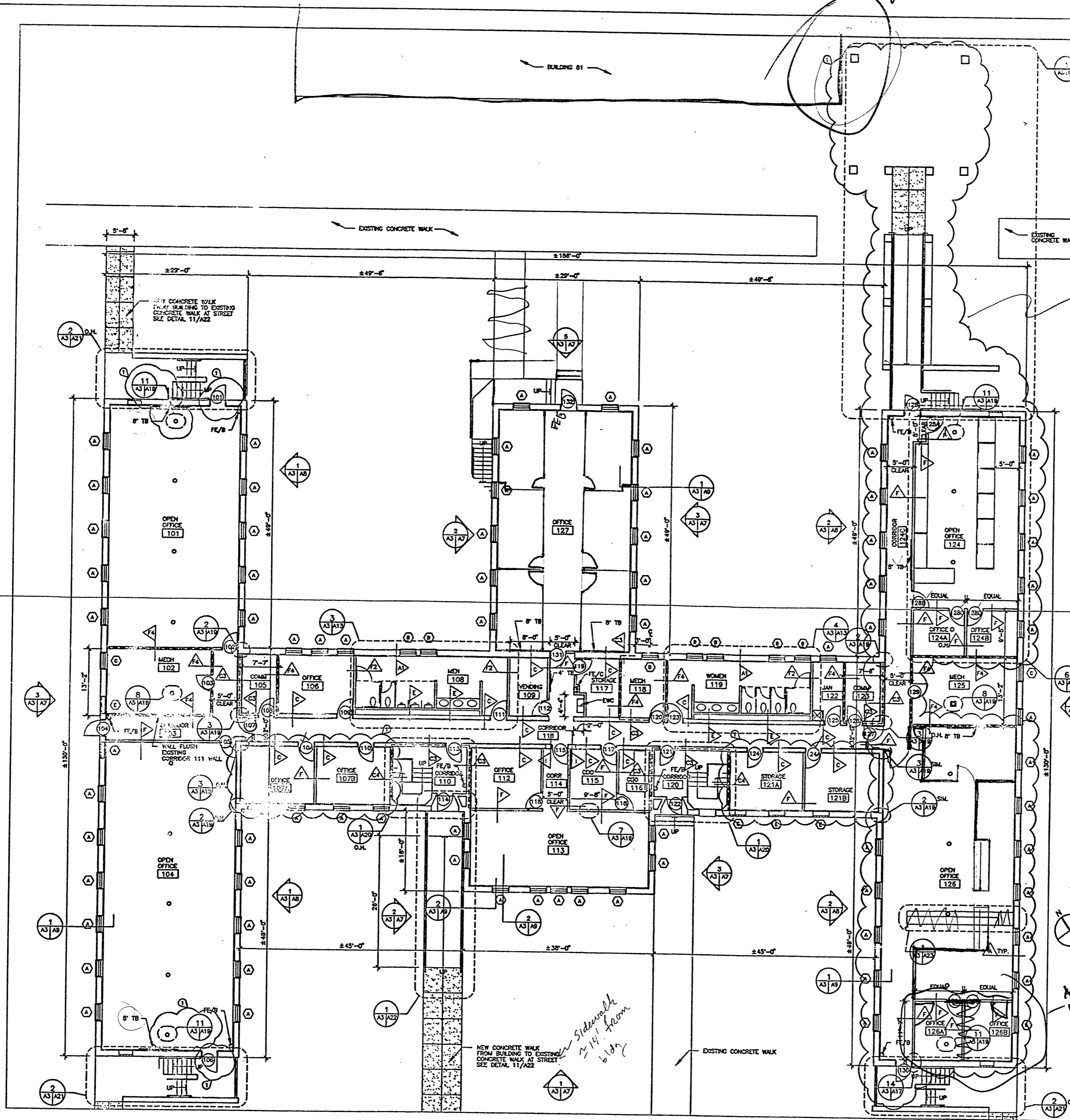
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
1	REVISION 1	3/24/02	

GENERAL NOTES

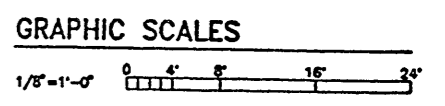
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO STARTING WORK.

LEGEND

- 1 HOUR RATED PARTITION
- PARTITION TYPE - SEE SHEET A19
- FIRE EXTINGUISHER CABINET (SEE DET. 445/A5)
- FIRE EXTINGUISHER BRACKET (SEE DET. 3/A5)
- TACKBOARD - SEE 3/A16
- DOOR NUMBER - SEE DOOR SCHEDULE SHEETS A16
- WINDOW TYPE - SEE 1/A16



FIRST FLOOR PLAN



Gantt Huberman Architects 500 North Tryon Street Charlotte, NC 28202-4208		DEPARTMENT OF THE ARMY MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA		A-3
DES.	DCT	SUBMITTED BY: JAH		NAVFAC DRAWING NO. 4448527
DR.	DCT, BBC	DECISION DATE:		CONCT. CONTR. NO. 662470-88-B-3775
CHK.	JAH, DCT	APPROVED: <i>C.N. Baker</i> 6-3-02		SHEET 4 OF 50
SUBMITTED BY:	JAH	DATE:	6-3-02	SCALE: NOTED
DESIGNER:		DATE:		SPEC. 05-88-3775
APPROVED:		DATE:		
SATISFACTORY TO:		DATE:		

BLUE ROCK STRUCTURES, INC.
AS-BUILT DRAWINGS

2:15011310020000011201100000011.dwg, Tue Mar 20 12:42:34 2002

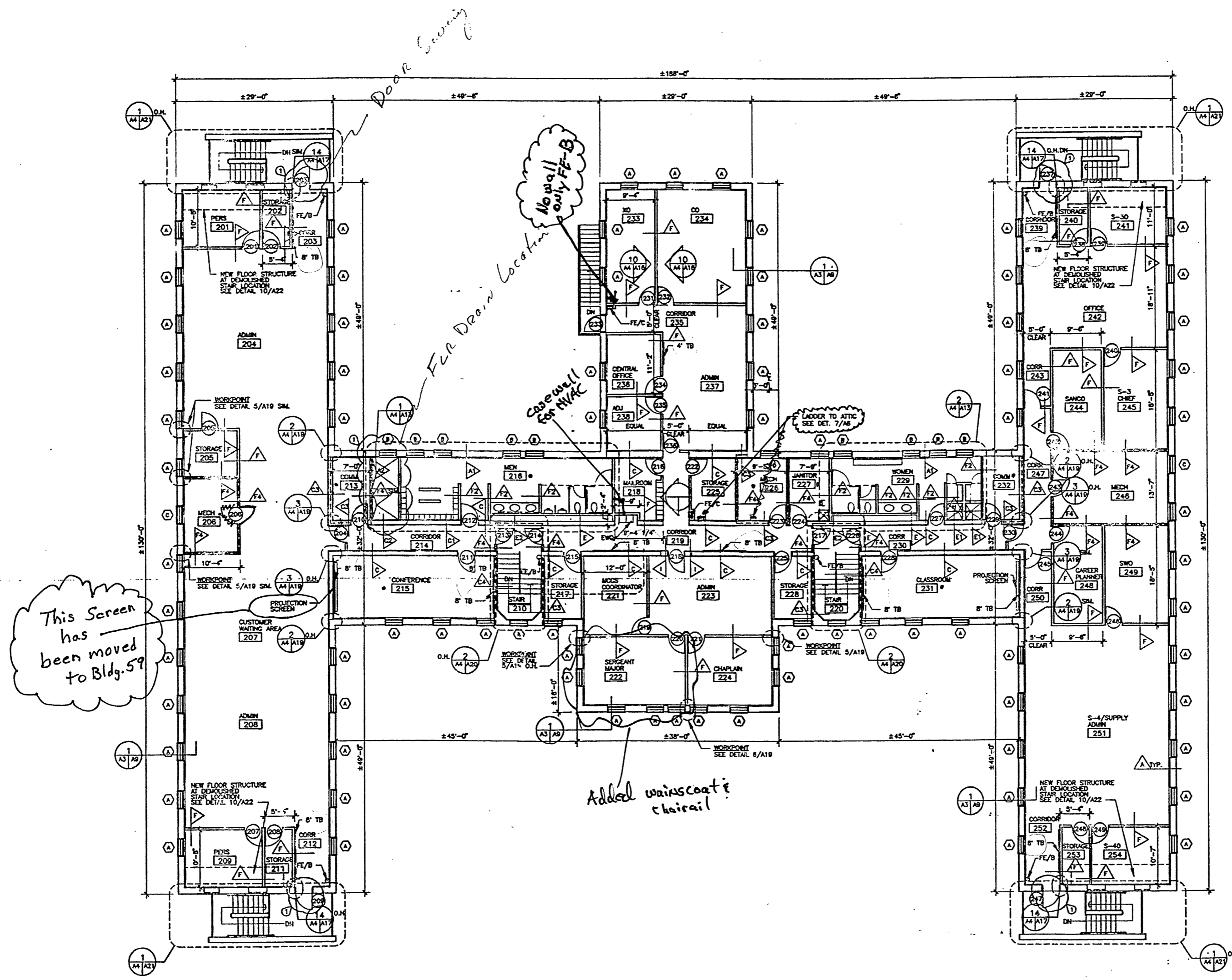
REVISIONS			
NO.	DESCRIPTION	DATE	APPROVED
1	AMENDMENT NO. 0003	8/13/01	

GENERAL NOTES

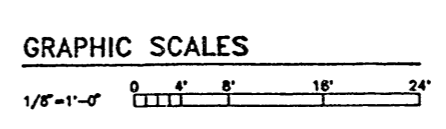
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO STARTING WORK.

LEGEND

- 1 HOUR RATED PARTITION
- △ PARTITION TYPE - SEE SHEET A18
- FE/C FIRE EXTINGUISHER CABINET (SEE DET. 445/A8)
- FE/B FIRE EXTINGUISHER BRACKET (SEE DET. 3/A8)
- TB TACKBOARD - SEE 3/A18
- ① DOOR NUMBER - SEE DOOR SCHEDULE SHEETS A18
- WINDOW TYPE - SEE 1/A18



1 SECOND FLOOR PLAN
1/8" = 1'-0"



BLUE ROCK
STRUCTURES, INC.
AS-BUILT DRAWINGS

A-4

Gantt Huberman Architects 500 North 7th Street Charlotte, NC 28202 (704) 344-8833 Fax (704) 344-8838	MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA	
	RENOVATE BUILDING 60 SECOND FLOOR PLAN	
DES. DCT DR. DCT, BBC CHK. JAH, DCT SUBMITTED BY: JAH DESIGN DIR.	SIZE CODE IDENT. NO. F 80091	NAVFAC DRAWING NO. 4448528
APPROVED: PFD OR DICC C.H. Baker 6-3-02	DATE 6-3-02	CONST. CONTR. NO. N62470-85-B-3775 SCALE: NOTED SPEC. 05-88-3775 SHEET 5 OF 50

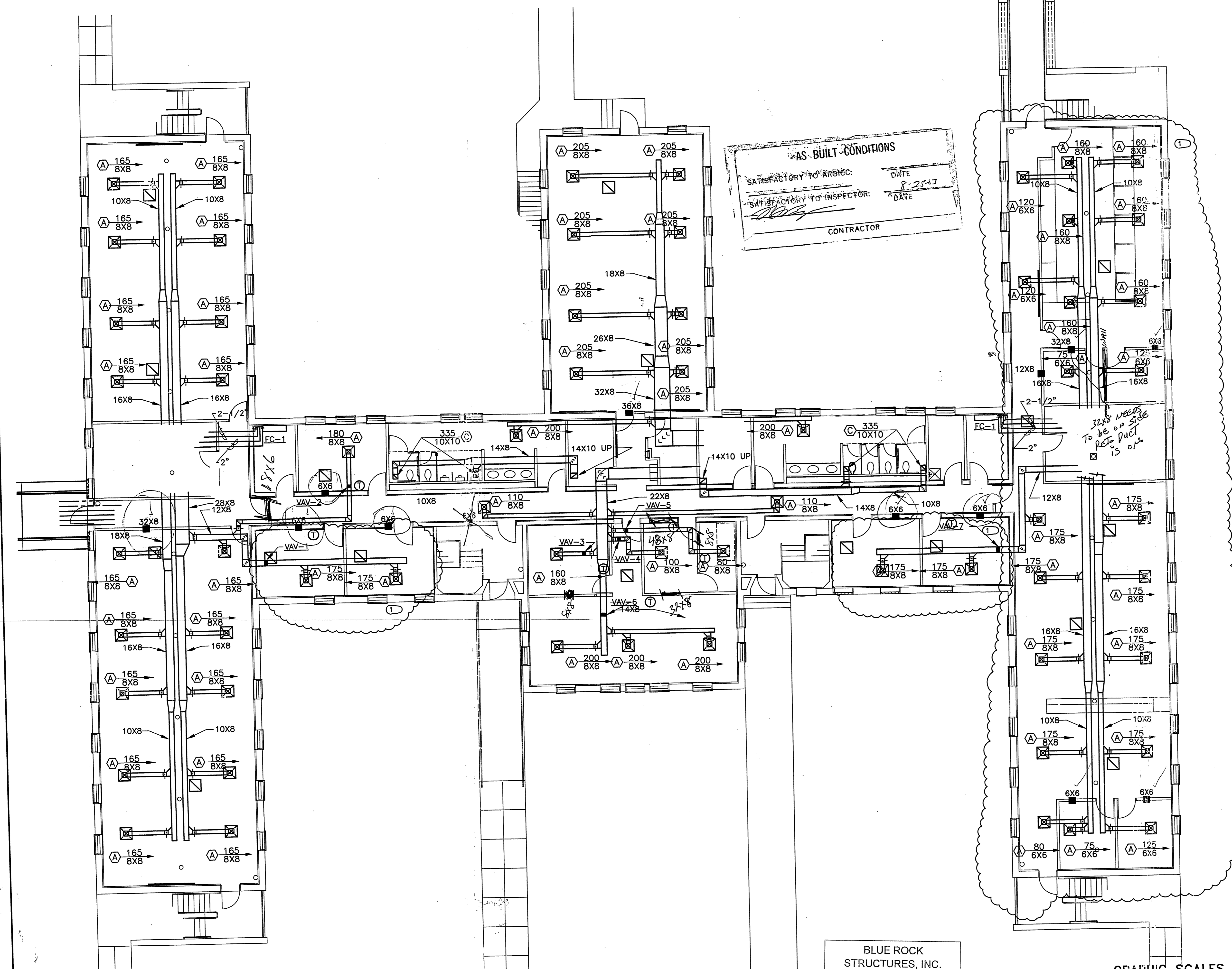


E:\NAVY\10200000\10200000.dwg The May 28 11:41:00 2002

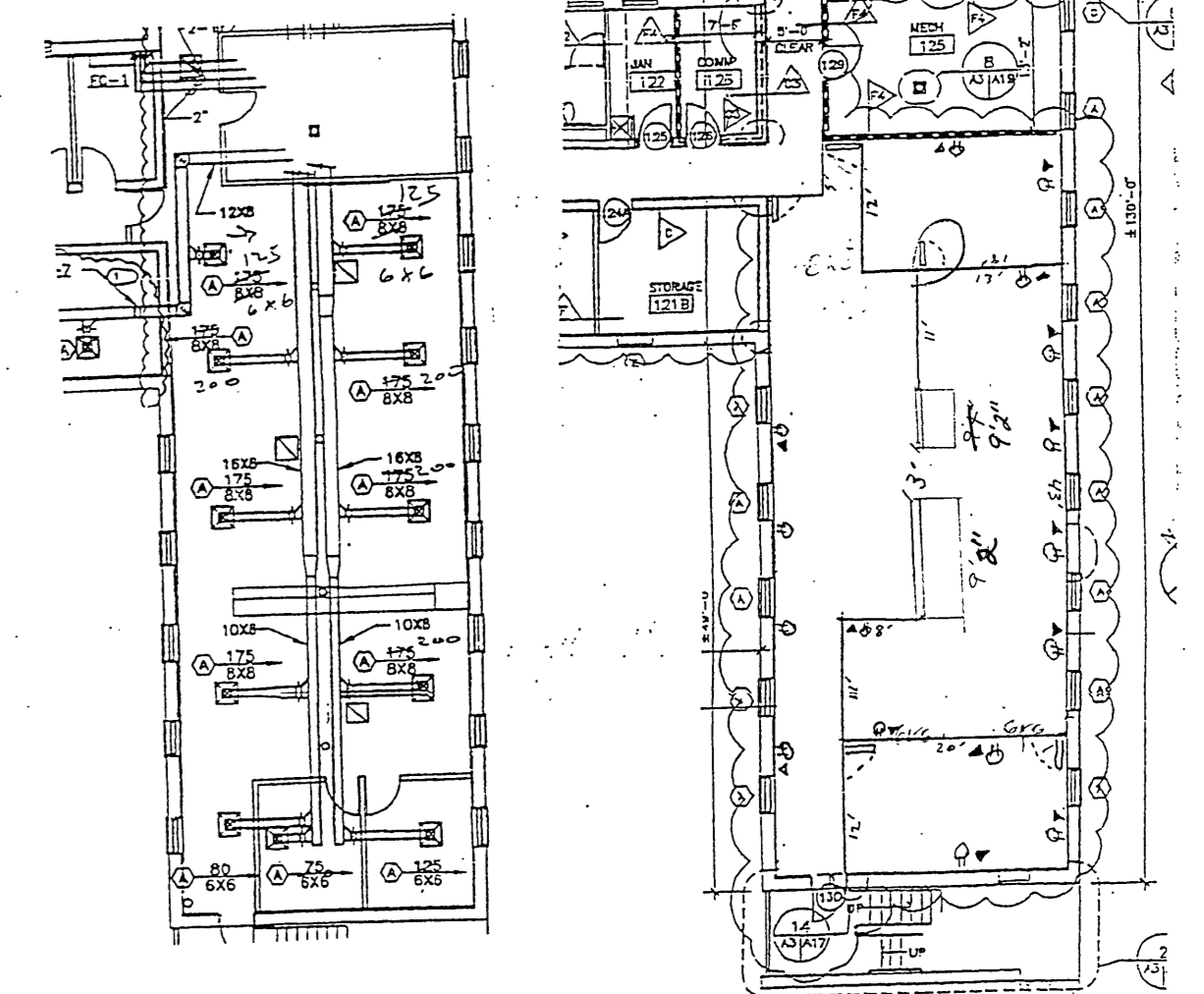
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
1	REVISION 0001	5/24/02	
2	REVISION 0002	12/31/02	

NOTE:
PROVIDE FIRESTOPPING THROUGH ALL RATED WALLS
AND FLOORS IN ACCORDANCE WITH SPECIFICATION

(CAL. SUMMER)
1. 1000 16" O.D.
2. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
3. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
4. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
5. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
6. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
7. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
8. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
9. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE
10. 1000 8" X 8" X 8" SYSTEM BAYED EACH SIDE



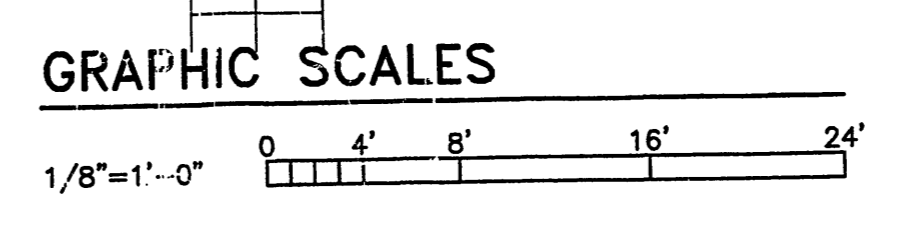
AS-BUILT CONDITIONS
SATISFACTORY TO ARCHT: DATE 8-25-07
SATISFACTORY TO INSPECTOR: DATE
CONTRACTOR



VAV's 1, 6, 7
Removed

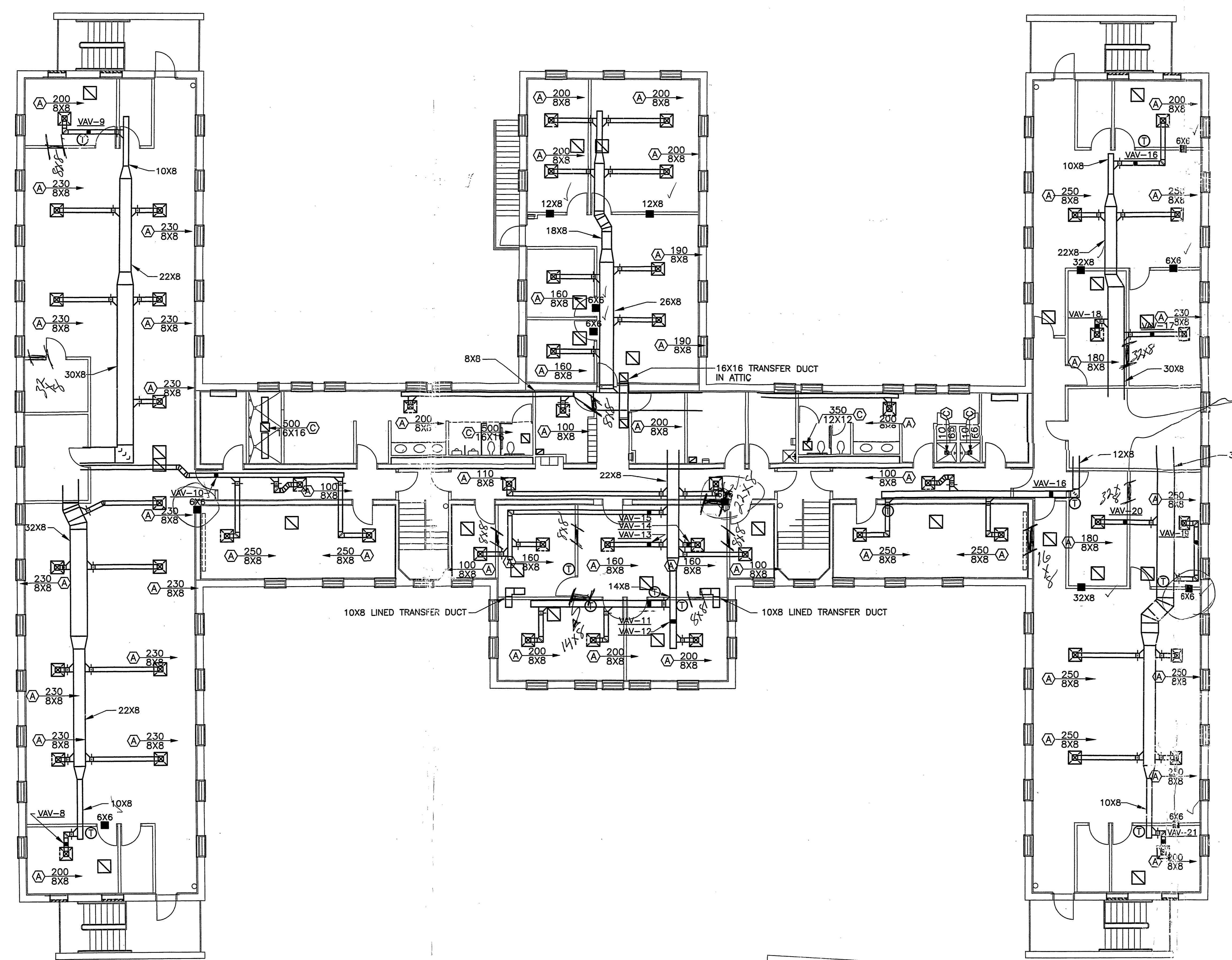
FIRST FLOOR PLAN
SCALE: 1/8" = 1'-0"

BLUE ROCK
STRUCTURES, INC.
AS-BUILT DRAWINGS



CROCKFORD AND ASSOCIATES, INC. CONSULTING ENGINEERS P.O. BOX 36761 CHARLOTTE, NC 28236	Gantt Huberman Architects 200 North Tryon Street Charlotte, NC 28202 704.342.9639 Fax 704.342.9639		DEPARTMENT OF THE NAVY MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA RENOVATE BUILDING 60 FIRST FLOOR PLAN HVAC	M-4	
	DES.	MSW			NAVFAC DRAWING NO. 4448556
	SUBMITTED BY: JAH DESIGN DIR. APPROVED: PWO OR OIC	DATE DATE DATE			SIZE F 80091
Satisfactory To:		SCALE: NOTED SPEC. 05-88-3775		SHEET 33 OF 50	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
2	REVISION 0002	12/31/02	



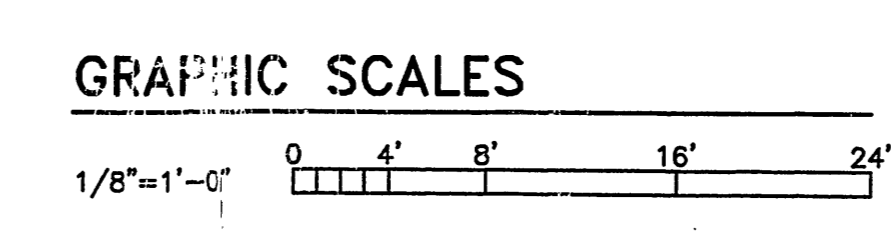
AS BUILT CONDITIONS
 SATISFACTORY TO AROICC: _____ DATE _____
 SATISFACTORY TO INSPECTOR: _____ DATE 8/2/03
 CONTRACTOR _____

Check side of wall RET. Duct is or-?

VAV's 10, 16 Removed

SECOND FLOOR PLAN
 SCALE: 1/8" = 1'-0"

BLUE ROCK
 STRUCTURES, INC.
 AS-BUILT DRAWINGS



CROCKFORD AND ASSOCIATES, INC. CONSULTING ENGINEERS P.O. BOX 36761 CHARLOTTE, NC 28236	Gantt Huberman Architects 500 North Tryon Street Charlotte, NC 28202 704.342.6436 Tel. 704.342.9639 Fax	DEPARTMENT OF THE ARMY MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA	
		RENOVATE BUILDING 60 SECOND FLOOR PLAN HVAC	
DES. MSW DR. MSW CHK. MSW SUBMITTED BY: JAH DESIGN DIR. APPROVED: PWO OR OICC SATISFACTORY TO:	DATE _____ DATE _____ DATE _____	SIZE CODE IDENT. NO. F 80091	NAVFAC DRAWING NO. 4448557 CONST. CONTR. NO. N62470-88-B-3775 SCALE: NOTED SPEC. 05-88-3775 SHEET 34 OF 50

M-5