EAST BAY MUNICIPAL UTILITY DISTRICT

REQUEST FOR PROPOSAL (RFP)
For
Main Wastewater Treatment Plant HVAC and Building Improvements (MWWTP HVAC and Building Improvements)

Contact Person: Dominic La Marche, Assistant Engineer
Phone Number: (510) 287-0779
E-mail Address: dominic.lamarche@ebmud.com

For complete information regarding this project, see RFP posted at https://www.ebmud.com/business-center/requests-proposal-rfps/ or contact the EBMUD representative listed above. Please note that prospective bidders are responsible for reviewing this site during the RFP process for any published addenda regarding this RFP.

RESPONSE DUE
by
4:00 p.m.
on
January 25, 2019
at
EBMUD, Purchasing Division
375 Eleventh St., First Floor
Oakland, CA 94607

EAST BAY MUNICIPAL UTILITY DISTRICT
RFP

For

Main Wastewater Treatment Plant HVAC and Building Improvements
(MWWTP HVAC and Building Improvements)

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EXHIBITS

I. STATEMENT OF WORK

A. SCOPE SUMMARY

It is the intent of these specifications, terms, and conditions to describe the Main Wastewater Treatment Plant (MWWTP) Heating, Air Conditioning, Ventilation (HVAC) and Building Improvements Project. This Project will evaluate and implement much needed improvements to the HVAC and fire protection systems for three buildings located at the MWWTP.

East Bay Municipal Utility District (District) intends to award a professional services contract to the Proposer(s) who best meets the District's requirements.

B. PROPOSER QUALIFICATIONS

1. To be considered for this project, the Qualifications Summary Form, included in **EXHIBIT A**, must be completed. For all projects listed in the Qualifications Summary, a project description must be included, demonstrating that the firm(s) and the persons proposed for this project meet the required minimum qualifications. References must also be provided for all qualifying project experience to verify the project scope, budget, performance, and quality of work completed.

2. Proposer Minimum Qualifications

    a. Lead Firm: The lead firm shall oversee and coordinate all aspects of the proposed project team's scope of work. The lead firm's qualifications must demonstrate its experience on projects of similar type, size, and complexity as the proposed project. Experience must include at least the following:

        (1) Two HVAC retrofit, upgrade, rehabilitation, or design projects completed within the last five years with a minimum fee of $250,000.

    b. Project Team: For each element indicated below, clearly indicate the firm on the project team with the required experience. The referenced experience must show successful completion of the project component involving the relevant project element. A referenced project may be used for more than one element.

        (1) HVAC system condition assessment and facility design for wastewater treatment plant and laboratory facilities.

(2) Fire protection system condition assessment and facility design.

c. Project Manager/Key Personnel: Provide both technical and managerial qualifications for the proposed Project Manager and Key Personnel. Proposed personnel must meet the following minimum requirements:

(1) Project Manager must have had successful experience in completing at least two HVAC system design, retrofit, or upgrade projects in the last five years with a minimum fee of $100,000 each;

(2) Project Manager must be an employee of the lead firm with at least five years of experience;

(3) Key Personnel must have at least three years of experience in their respective disciplines and must demonstrate capabilities from at least two projects in one or more of the elements stated above.

d. The Project Manager will be the primary client contact, and is responsible for the day-to-day management of the project, ensuring that the project scope, budget, and schedule are met. The following information should be provided for the Project Manager and Key Personnel:

(1) Years of experience,

(2) Percent (%) time available for this project, and

(3) Resumes (should demonstrate experience beyond minimum qualification requirements)

e. Key Personnel shall include a Fire Protection Engineer licensed in the state of California.

f. Proposer shall possess all permits, licenses, and professional credentials necessary to perform services as specified under this RFP.

g. Proposer shall be qualified to prepare Title 24 Compliance documentation.

C. SPECIFIC REQUIREMENTS

Refer to **EXHIBIT C** for the Specific Requirements

D. DELIVERABLES / REPORTS

Refer to **EXHIBIT C** for the required deliverables

II. CALENDAR OF EVENTS

EVENT	DATE/LOCATION	
RFP Issued	December 7, 2018	
Pre-Proposal Meeting/Site Walk	December 19, 2018, 10:00 a.m.	at: MWWTP 2020 Wake Ave. Oakland, CA 94607
Deadline for Proposers to Submit Written Questions	January 11, 2019 by 4:00 p.m.	
Response Due	January 25, 2019, 4:00 p.m.	
Notify Firms Selected for Interviews	February 1, 2019	
Interviews	February 11, 2019 thru February 15, 2019	
Select consultant or consultant team	February 15, 2019	
Negotiate contract & Management Review	February 18, 2019 thru March 12, 2019	
Board approval	March 12, 2019	
Notice to proceed	March 15, 2019	

Note: All dates are subject to change.
Proposers are responsible for reviewing **https://www.ebmud.com/business-center/requests-proposal-rfps/** for any published addenda. Hard copies of addenda will not be mailed out.

A. NON-MANDATORY SITE PRE-PROPOSAL MEETING/SITE WALK

Prospective proposers are invited to a non-mandatory, pre-proposal meeting and site walk of the facilities relevant to the project. The meeting will be an opportunity for EBMUD staff to describe the project scope of work and answer any questions.

Location: Main Wastewater Treatment Plant
2020 Wake Ave.
Oakland, CA 94607

Date: December 19, 2018 at 10:00 a.m.

Attendees are asked to RSVP no later than December 14 by emailing dominic.lamarche@ebmud.com.

Attendees may park in the parking area to the right of the main entrance gate. Attendees MUST check in at the Security Office.

III. DISTRICT PROCEDURES, TERMS, AND CONDITIONS

A. RFP ACCEPTANCE AND AWARD

1. RFP responses will be evaluated by the Selection Committee and will be scored and ranked in accordance with the RFP section entitled "Evaluation Criteria/Selection Committee."

2. The top two to three firms that best meet the criteria will be invited to a panel interview.

3. The Selection Committee will recommend award to the Proposer who, in its opinion, best serves the overall interests of the District. Award may not necessarily be made to the Proposer with the lowest overall cost.

4. The District has the right to decline to award this contract or any part of it for any reason.

5. Any specifications, terms, or conditions issued by the District, or those included in the Proposer's submission, in relation to this RFP, may be incorporated into any purchase order or contract that may be awarded as a result of this RFP.

6. The District reserves the right to reject any or all proposals, to accept one part of a proposal and reject the other, unless the bidder stipulates to the contrary, and to waive minor technical defects and administrative errors, as the interest of the District may require. Award will be made or proposals rejected by the District as soon as possible after bids have been opened.

B. EVALUATION CRITERIA/SELECTION COMMITTEE

All proposals will be evaluated by a Selection Committee. The Selection Committee will select a Proposer in accordance with the evaluation criteria set forth in this RFP. The evaluation of the RFP responses shall be within the sole judgment and discretion of the Selection Committee.

RFP responses will be evaluated according to the Evaluation Criteria below, and scored according to a point scale. The scores for all Evaluation Criteria will then be added to arrive at a weighted score for each RFP response. An RFP response with a high weighted total will be ranked higher than one with a lesser-weighted total.

The Evaluation Criteria are as follows:

	Evaluation Criteria
A.	**Project Understanding and Approach:** RFP responses will be evaluated against the RFP specifications and the questions below: 1. How well has the Proposer identified pertinent issues and potential problems related to the project? 2. Does the Consultant identify a clear and logical approach to implementing the required improvements? 3. Does the Consultant describe technical solutions that meet District needs in an effective and cost efficient way?
B.	**Relevant Experience:** RFP responses will be evaluated against the RFP specifications and the questions below: 1. Does the Project Team have relevant experience with evaluation and design of HVAC and fire protection systems for similar facilities? 2. Does the Project Team have familiarity with wastewater facilities and laboratory facilities? 3. Does the Project Team have experience working with municipal agencies? 4. Does the Project Manager have experience relevant to this Project?
C.	**Implementation Plan and Schedule:** An evaluation will be made of the likelihood that the Proposer's implementation plan and schedule will meet the District's schedule. Labor hours for each task will be evaluated to ensure Consultant's understanding of the scope and allocation of resources meets the Districts expectations
D.	**Oral Presentation and Interview:** The oral interview may consist of standard questions asked of each of the Proposers and specific questions regarding the specific RFP response.
E.	**References (See Qualifications Summary Form in EXHIBIT A):** References are only performed on the shortlisted Proposers and the score for reference checks is not included in the preliminary short list score.
F.	**Contract Equity Program:** Proposer shall be eligible for SBE or DVBE preference points if they are a certified small business entity, as described in the guidelines contained in **EXHIBIT A**-Contract Equity Program, and they check the appropriate box, requesting preference, in **EXHIBIT A**-Proposer Information and Acceptance. Qualified DVBEs and/or SBEs will receive up to 5 percentage points maximum to their total score.

The best proposing consultants will be invited to an interview by the District. At the interview, the Consultant shall introduce the project manager and any other key members of the proposing team, and summarize their qualifications and experience in response to the RFP. The Consultant shall also concisely present its approach to the key items noted in the qualifications section criteria, and respond extemporaneously to questions.

C. PROTESTS

Protests must be in writing and must be received no later than seven (7) business days after the District issues the Notice of Intent to Award, which is sent to all entities who submitted a proposal. The District will reject the protest as untimely if it is received after this specified time frame. Protests will be accepted from proposers or potential proposers only.

If the protest is mailed and not received by the District, the protesting party bears the burden of proof to submit evidence (e.g., certified mail receipt) that the protest was sent in a timely manner so that it would be received by the District within the RFP protest period.

Bid protests must contain a detailed and complete written statement describing the reason(s) for protest. The protest must include the name and/or number of the bid, the name of the firm protesting, and include a name, telephone number, email address and physical address of the protester. If a firm is representing the protester, they shall include their contact information in addition to that of the protesting firm.

Protests must be mailed or hand delivered to the Manager of Wastewater Engineering, East Bay Municipal Utility District, 375 Eleventh Street, Mailstop 702, Oakland, CA 94607 or P.O. Box 24055, MS 702, Oakland, California 94623. Facsimile and electronic mail protests must be followed by a mailed or hand delivered identical copy of the protest and must arrive within the seven day time limit. Any bid protest filed with any other District office shall be forwarded immediately to the Manager of Wastewater Engineering.

The bid protester can appeal the determination to the requesting organization's Wastewater Department Director. The appeal must be submitted to the Department Director no later than five business days from the date of receipt of the requesting organization's determination on the protest.

Such an appeal must be made in writing and must include all grounds for the appeal and copies of the original protest and the District's response. The bid protester must also send the Wastewater Engineering Division a copy of all materials sent to the

Wastewater Department Director. The Wastewater Department Director will make a determination of the appeal and respond to the protester by certified mail in a timely manner. If the appeal is denied, the letter will include the date, time, and location of the Board of Directors meeting at which staff will make a recommendation for award and inform the protester it may request to address the Board of Directors at that meeting.

The District may transmit copies of the protest and any attached documentation to all other parties who may be affected by the outcome of the protest. The decision of the District as to the validity of any protest is final. This District's final decision will be transmitted to all affected parties in a timely manner.

D. INVOICING

1. Payment will be made within thirty (30) days following receipt of a correct invoice and upon complete satisfactory performance of services.

2. The District will notify the Professional Service Provider of any invoice adjustments required.

3. Invoices shall contain, at a minimum, District purchase order number, invoice number, remit to address, and itemized services description.

4. The District will pay Professional Service Provider in an amount not to exceed the negotiated amount(s) which will be referenced in the agreement signed by both parties.

IV. RFP RESPONSE SUBMITTAL INSTRUCTIONS AND INFORMATION

A. DISTRICT CONTACTS

All contact during the competitive process is to be through the contact listed on the first page of this RFP. The following persons are to be contacted only for the purposes specified below:

FOR INFORMATION REGARDING PROJECT SCOPE:
Attn: Dominic La Marche, Assistant Engineer
EBMUD-Wastewater Department
E-Mail: dominic.lamarche@ebmud.com
PHONE: (510) 287-0779

FOR INFORMATION ON THE CONTRACT EQUITY PROGRAM:
Attn: Contract Equity Office
PHONE: (510) 287-0114

B. SUBMITTAL OF RFP RESPONSE

1. Late and/or unsealed responses will not be accepted.

2. RFP responses submitted via electronic transmissions will not be accepted. Electronic transmissions include faxed RFP responses or those sent by e-mail.

   RFP responses will be received only at the address shown below, must be SEALED, and must be received at the District Purchasing Division by 4:00 p.m. on the due date specified in the Calendar of Events. Any RFP response received after that time or date, or at a place other than the stated address cannot be considered and will be returned to the Proposer unopened. All RFP responses must be received and time stamped at the stated address by the time designated. The Purchasing Division's timestamp shall be considered the official timepiece for the purpose of establishing the actual receipt of RFP responses.

3. RFP responses are to be addressed/delivered as follows:

   Mailed:
   Andrew Akelman, Manager of Purchasing
   East Bay Municipal Utility District
   MWTP HVAC and Building Improvements Project
   EBMUD–Purchasing Division
   P.O. Box 24055
   Oakland, CA 94623

   Hand Delivered or delivered by courier or package delivery service:
   Andrew Akelman, Manager of Purchasing
   East Bay Municipal Utility District
   MWTP HVAC and Building Improvements Project
   EBMUD–Purchasing Division
   375 Eleventh Street, First Floor
   Oakland, CA 94607

   Proposer's name, return address, and the RFP title must also appear on the mailing package.

4. Proposers are to submit four (4) original hardcopy RFP response (**EXHIBIT A** – RFP Response Packet, including Contract Equity Program forms and all additional

documentation stated in the "Required Documentation and Submittals" section of **EXHIBIT A**), all with original ink signatures.

Proposers **must** also submit an electronic copy of their RFP response, following the submittal of their hardcopy RFP response Package. The file must be sent via email or file transfer site to dominic.lamarche@ebmud.com. The electronic copy should be in a single file (PDF) format, and shall be an **exact** copy of the original hard copy **EXHIBIT A** – RFP Response Packet, Contract Equity Program forms and all additional documentation stated in the "Required Documentation and Submittals" section of **EXHIBIT A**.

5. All costs required for the preparation and submission of an RFP response shall be borne by the Proposer.

6. California Government Code Section 4552: In submitting an RFP response to a public purchasing body, the Proposer offers and agrees that if the RFP response is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2, commencing with Section 16700, of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the Proposer for sale to the purchasing body pursuant to the RFP response. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the Proposer.

7. Proposer expressly acknowledges that it is aware that if a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, Cal. Gov. Code, §12650 et seq.), the District will be entitled to civil remedies set forth in the California False Claim Act.

8. The RFP response shall remain open to acceptance and is irrevocable for a period of one hundred eighty (180) days, unless otherwise specified in the RFP documents.

9. It is understood that the District reserves the right to reject any or all RFP responses.

C. RESPONSE FORMAT

1. Proposers shall not modify any part of **EXHIBIT A** or qualify their RFP responses. Proposers shall not submit to the District a re-typed or otherwise re-created version of these documents or any other District-provided document.

2. RFP responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFP response or part thereof so marked. RFP responses submitted in response to this RFP may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.

EXHIBIT A
RFP RESPONSE PACKET
RFP For – Main Wastewater Treatment Plant HVAC and Building Improvements

To: The EAST BAY MUNICIPAL UTILITY District ("District")

From: _____
(Official Name of Proposer)

RFP RESPONSE PACKET GUIDELINES

- AS DESCRIBED IN SECTION IV- RFP RESPONSE SUBMITTAL INSTRUCTIONS AND INFORMATION, PROPOSERS ARE TO SUBMIT FOUR (4) ORIGINAL HARDCOPY RFP RESPONSES WITH ORIGINAL INK SIGNATURES, AND ONE (1) ELECTRONIC COPY CONTAINING THE FOLLOWING, IN THEIR ENTIRETY:
  - **EXHIBIT A** – RFP RESPONSE PACKET
    - INCLUDING ALL REQUIRED DOCUMENTATION AS DESCRIBED IN "**EXHIBIT A**-REQUIRED DOCUMENTATION AND SUBMITTALS"

- PROPOSERS THAT DO NOT COMPLY WITH THE REQUIREMENTS, AND/OR SUBMIT AN INCOMPLETE RFP RESPONSE MAY BE SUBJECT TO DISQUALIFICATION AND THEIR RFP RESPONSE REJECTED IN WHOLE.

- IF PROPOSERS ARE MAKING ANY CLARIFICATIONS AND/OR AMENDMENTS, OR TAKING EXCEPTION TO ANY PART OF THIS RFP, THESE MUST BE SUBMITTED IN THE EXCEPTIONS, CLARIFICATIONS, AND AMENDMENTS SECTION OF THIS **EXHIBIT A** – RFP RESPONSE PACKET. THE DISTRICT, AT ITS SOLE DISCRETION, MAY ACCEPT AMENDMENTS/EXCEPTIONS, OR MAY DEEM THEM TO BE UNACCEPTABLE, THEREBY RENDERING THE RFP RESPONSE DISQUALIFIED.

- BIDDERS SHALL NOT MODIFY DISTRICT LANGUAGE IN ANY PART OF THIS RFP OR ITS EXHIBITS, NOR SHALL THEY QUALIFY THEIR RFP RESPONSE.

PROPOSER INFORMATION AND ACCEPTANCE

1. The undersigned declares that all RFP documents, including, without limitation, the RFP, Addenda, and Exhibits, have been read and that the terms, conditions, certifications, and requirements are agreed to.

2. The undersigned is authorized to offer, and agrees to furnish, the articles and services specified in accordance with the RFP documents.

3. The undersigned acknowledges acceptance of all addenda related to this RFP. List Addenda for this RFP on the line below:

Addendum #	Date

4. The undersigned hereby certifies to the District that all representations, certifications, and statements made by the Proposer, as set forth in this RFP Response Packet and attachments, are true and correct and are made under penalty of perjury pursuant to the laws of California.

5. The undersigned acknowledges that the Proposer is, and will be, in good standing in the State of California, with all the necessary licenses, permits, certifications, approvals, and authorizations necessary to perform all obligations in connection with this RFP and associated RFP documents.

6. It is the responsibility of each Proposer to be familiar with all of the specifications, terms, and conditions and, if applicable, the site condition. By the submission of an RFP response, the Proposer certifies that if awarded a contract it will make no claim against the District based upon ignorance of conditions or misunderstanding of the specifications.

7. Patent indemnity: Professional Service Providers who do business with the District shall hold the District, its Directors, officers, agents, and employees harmless from liability of any nature or kind, including cost and expenses, for infringement or use of any patent, copyright or other proprietary right, secret process, patented or unpatented invention, article, or appliance furnished or used in connection with the contract or purchase order.

8. Insurance certificates are not required at the time of submission. However, by signing **EXHIBIT A** – RFP Response Packet, the Proposer agrees to meet the minimum insurance requirements stated in the RFP. This documentation must be provided to the District prior to execution of an agreement by the District,

and shall include an insurance certificate which meets the minimum insurance requirements, as stated in the RFP.

9. The undersigned acknowledges that RFP responses, in whole or in part, are NOT to be marked confidential or proprietary. The District may refuse to consider any RFP response or part thereof so marked. RFP responses submitted in response to this RFP may be subject to public disclosure. The District shall not be liable in any way for disclosure of any such records.

10. The undersigned Proposer hereby submits this RFP response and binds itself to the District. The RFP, subsequent Addenda, Proposers Response Packet, and any attachments, shall be used to form the basis of a Contract, which once executed shall take precedence.

11. The undersigned acknowledges ***ONE*** of the following (please check only one box)*:

☐ Proposer is not an SBE nor a DVBE and is ineligible for any Proposal preference; **OR**

☐ Proposer is an SBE or DVBE as described in the Contract Equity Program (CEP) and Equal Employment Opportunity (EEO) Guidelines, and has completed the CEP and EEO forms at the hyperlink contained in the CEP and EEO section of this **EXHIBIT A**.

*If no box is checked it will be assumed that the Proposer is ineligible for Proposal preference and none will be given. For additional information on SBE/DVBE Proposal preference please refer to the Contract Equity Program and Equal Employment Opportunity Guidelines at the above referenced hyperlink.

Official Name of Proposer (exactly as it appears on Proposer's corporate seal and invoice): _____

Street Address Line 1: _____

Street Address Line 2: _____

City: _____ State: _____ Zip Code: _____

Webpage: _____

Type of Entity / Organizational Structure (check one):

☐ Corporation ☐ Joint Venture

☐ Limited Liability Partnership ☐ Partnership

☐ Limited Liability Corporation ☐ Non-Profit / Church

☐ Other: _____

Jurisdiction of Organization Structure: _____

Date of Organization Structure: _____

Federal Tax Identification Number: _____

Department of Industrial Relations (DIR) Registration Number: _____

Primary Contact Information:

Name / Title: _____

Telephone Number: _____ Fax Number: _____

E-mail Address: _____

Street Address Line 1: _____

City: _____ State: _____ Zip Code: _____

SIGNATURE: _____

Name and Title of Signer (printed): _____

Dated this _____ day of _____ 20_____

REQUIRED DOCUMENTATION AND SUBMITTALS

All of the specific documentation listed below is required to be submitted with the **EXHIBIT A** – RFP Response Packet. Proposers shall submit all documentation, in the order listed below, and clearly label each section of the RFP response with the appropriate title (i.e. Table of Contents, Letter of Transmittal, Key Personnel, etc.).

1. **Letter of Transmittal**: The letter of transmittal should clearly identify the Consultant, the office location(s) where the work would be performed, and the project manager, key technical personnel, and subconsultants that will perform the work. The letter should be signed by an individual having authority to execute an agreement with the District.

2. **Statement of Qualifications**: To be considered for this project, your firm must complete the Qualifications Summary Form in this Exhibit. In addition to this form, the proposal should include documentation elaborating on relevant experience and qualifications that will demonstrate the required qualifications to complete the work. In general, the statement of qualifications should;

    (1) Elaborate on projects listed in the Qualifications Summary Form including key project accomplishments, challenges, and results
    (2) Note additional projects completed by project team relevant to the scope of work
    (3) Describe team experience working with municipal agencies, wastewater treatment facilities, and laboratory facilities.
    (4) Document project team's experience in evaluation studies as well as detailed design work
    (5) Demonstrate qualifications in preparation to Title 24 documentation

3. **Project Approach**: The proposal should include a clear and complete discussion of each task required to fulfill the project objectives, and in sufficient detail to present the proposed approach. In general, the project approach should demonstrate;
    (1) Clear understanding of project scope and district needs
    (2) Logical sequence of work to progress from evaluation phases thru final design
    (3) Innovative and cost effective solutions to address scope items
    (4) Effective quality assurance and quality control protocols

4. **Project Management and Staffing**: The proposal should describe;
    (1) Organization of project team with respect to firms and key personnel. Organization chart can be provided

(2) Discipline leads for specific disciplines such as mechanical, electrical and control, fire protection, and drafting
(3) Availability of key staff and support staff for completion of scope of work

5. **Labor Hours by Task**: Provide a detailed breakdown of labor hours by task and position, including subconsultants. The estimate of labor hours presented in the proposal will provide the basis for contract negotiations with the selected Consultant.

6. **Schedule**: The Consultant will evaluate the provided information to develop their own detailed work plan and schedule for the project including deliverables and other milestone dates in order to complete the project in a timely manner. Clearly identify the critical path and which tasks will run concurrently. The following major milestone deliverable dates must be included (at a minimum):

(1) Project Kickoff (February 2019)
(2) Predesign TMs

(3) **Bid Package One**
(4) 50% Design Submittal
(5) 90% Design Submittal
(6) Final Design Submittal
(7) Bid Period
(8) Construction Notice to Proceed
(9) Estimated Completion

(10) **Bid Package Two**
(11) Design
(12) Construction Notice to Proceed

(13) **Bid Package Three**
(14) Design
(15) Construction

7. **Contract Equity Program:**

(a) Every proposer must fill out, sign, and submit the appropriate sections of the Contract Equity Program and Equal Employment Opportunity documents located at the hyperlink contained in the last page of this **EXHIBIT A**. Special attention should be given to completing Form P-25, "Employment Data and Certification". Any proposer needing assistance in completing these forms should contact the District's Contract Equity Office at (510) 287-0114 prior to submitting an RFP response.

Submittal Length

Section	**Not to Exceed**[1]
Transmittal Letter	1 page
Statement of Qualifications (Including Qualifications Summary Form)	12 pages
Project Approach	6 pages
Project Management and Staffing	4 page
Labor Hours by Task	2 page[2]
Schedule	1 page[2]
Contract Equity Program Forms	As needed
Resumes (Maximum of two pages per person)	As needed

1. Page limits based on single-sided page count. Double sided pages count as two. Pages shall be 8 ½" x 11 except as noted
2. 11"x17" allowed

PROJECT QUALIFICATIONS SUMMARY FORM

Main Wastewater Treatment Plant HVAC and Building Improvements Project Qualifications Summary Form				
Under Project Team Definition: (1) indicate the estimated portion of the total consulting fee for which each firm is responsible. Total should equal 100%; (2) provide resumes for all key project personnel, and (3) refer to Section 3 for information on minimum qualifications. For qualifying experience, space is provided for two projects—add additional rows as needed. This form is available in MS Word by contacting Dominic La Marche (dominic.lamarche@ebmud.com).				
Project Team Definition				
	Firm	**Expertise**	**Est. %**	**M/WBE**
Lead:				
Sub:				
Sub:				
Sub:				
Sub:				
	Individual & Firm	**Expertise**	**Experience (Years)**	**% Availability**
Project Manager				
Key Personnel				
Key Personnel				
Key Personnel				
Key Personnel				
PRIMARY WORK LOCATION:				
<u>LEAD FIRM</u> QUALIFYING EXPERIENCE – HVAC SYSTEM DESIGN Project #1 Name and Client: Project Description: Personnel Involved and Role: Year Prepared: (2013-2018) Contract Fee: (>$250,000) Contact Name: Contact Phone:				**EBMUD Use Only**

LEAD FIRM QUALIFYING EXPERIENCE – HVAC SYSTEM DESIGN Project #2 Name and Client: Project Description: Personnel Involved and Role: Year Prepared: (2013-2018) Contract Fee: (>$250,000) Contact Name: Client Contact Name, Title, Phone No:	
<u>PROJECT TEAM FIRM</u> QUALIFYING EXPERIENCE – HVAC SYSTEM CONDITION ASSESSMENT AND FACILITY DESIGN FOR LABORATORY FACILITIES Project #1 Name and Client: Project Description: Personnel Involved and Role: Year Prepared: Contract Fee: Contact Name: Contact Phone:	
Project #2 Name and Client: (optional) Project Description: Personnel Involved and Role: Year Prepared: Contract Fee: Contact Name: Client Contact Name, Title, Phone No:	
<u>PROJECT TEAM FIRM</u> QUALIFYING EXPERIENCE – FIRE PROTECTION SYSTEM Project #1 Name and Client: Project Description: Personnel Involved and Role: Year Prepared: Contract Fee: Contact Name: Client Contact Name, Title, Phone No:	

Project #2 Name and Client: (optional) Project Description: Personnel Involved and Role: Year Prepared: Contract Fee: Contact Name: Client Contact Name, Title, Phone No:	
<u>PROJECT MANAGER</u> QUALIFYING PROJECT EXPERIENCE: HVAC SYSTEM FACILITY DESIGN Project #1 Name and Client: Project Description: Year Prepared: (2013-2018) Role: Contract Fee: >$100,000 Client Contact Name, Title, Phone No:	
<u>PROJECT MANAGER</u> QUALIFYING PROJECT EXPERIENCE: HVAC SYSTEM FACILITY DESIGN Project #2 Name and Client: Project Description: Year Prepared: (2013-2018) Role: Contract Fee: >$100,000 Client Contact Name, Title, Phone No:	
KEY PERSONNEL QUALIFYING EXPERIENCE: **(Repeat For Each Person)** Firm & Contact Name: Project #1 Name and Client: Project Description: Year Prepared: Role: Contract Fee: Firm & Contact Name: Client Contact Name, Title, Phone No:	

Firm & Contact Name: Project #2 Name and Client: Project Description: Year Prepared: Role: Contract Fee: Client Contact Name, Title, Phone No:	

KEY PERSONNEL QUALIFYING EXPERIENCE: **(Repeat For Each Person)** Firm & Contact Name: Project #1 Name and Client: Project Description: Year Prepared: Role: Contract Fee: Firm & Contact Name: Client Contact Name, Title, Phone No:	
Firm & Contact Name: Project #2 Name and Client: Project Description: Year Prepared: Role: Contract Fee: Client Contact Name, Title, Phone No:	

EXCEPTIONS, CLARIFICATIONS, AMENDMENTS

RFP For – Main Wastewater Treatment Plant HVAC and Building Improvements

Proposer Name:_____

List below requests for clarifications, exceptions, and amendments, if any, to the RFP and associated RFP documents, and submit with your RFP response.

The District is under no obligation to accept any exceptions and such exceptions may be a basis for RFP response disqualification.

Reference to:			**Description**
Page No.	Section	Item No.	
p. 23	**D**	**1.c.**	***Proposer takes exception to…***

*Print additional pages as necessary

CONTRACT EQUITY PROGRAM & EQUAL EMPLOYMENT OPPORTUNITY

The District's Board of Directors adopted the Contract Equity Program (CEP) to enhance equal opportunities for business owners of all races, ethnicities, and genders who are interested in doing business with the District. The program has contracting objectives, serving as the minimum level of expected contract participation for the three availability groups: white-men owned businesses, white-women owned businesses, and ethnic minority owned businesses. The contracting objectives apply to all contracts that are determined to have subcontracting opportunities, and to all General or Professional Service Providers regardless of their race, gender, or ethnicity.

All Contractors and their subcontractors performing work for the District must be Equal Employment Opportunity (EEO) employers, and shall be bound by all laws prohibiting discrimination in employment. There shall be no discrimination against any person, or group of persons, on account of race, color, religion, creed, national origin, ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), genetic information, or sexual orientation.

Contractor and its subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

All Contractors shall include the nondiscrimination provisions above in all subcontracts.
Please include the required completed forms with your proposal. Non-compliance with the Guidelines may deem a proposal non-responsive, and therefore, ineligible for contract award. Your firm is responsible for:

1) Reading and understanding the CEP guidelines.

2) Filling out and submitting with your bid the appropriate forms.

   The CEP guidelines and forms can be found at the following direct link:
   Contract Equity Program Guidelines and Forms

The CEP guidelines and forms can also be downloaded from the District website at the following link:
http://ebmud.com/business-center/contract-equity-program/

If you have questions regarding the Contract Equity Program please call (510) 287-0114.

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EXHIBIT B
INSURANCE REQUIREMENTS

Insurance certificates are not required at the time of submission; however, by signing EXHIBIT A – RFP Response Packet, the Proposer agrees to meet the minimum insurance requirements stated in the RFP. This documentation must be provided to the District, prior to award.

The following are the minimum insurance limits, required by the District, to be held by the GENERAL OR PROFESSIONAL SERVICE PROVIDER performing on this RFP:

INDEMNIFICATION AND INSURANCE

A. Indemnification

PROFESSIONAL SERVICE PROVIDER expressly agrees to defend, indemnify, and hold harmless the District and its Directors, officers, agents, and employees from and against any and all loss, liability, expense, claims, suits, and damages, including attorneys' fees, arising out of or resulting from GENERAL OR PROFESSIONAL SERVICE PROVIDER's, its associates', employees', subcontractors', or other agents' negligent acts, errors or omissions, or willful misconduct, in the operation and/or performance under this Agreement.

B. Insurance Requirements

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall take out and maintain during the life of the Agreement all the insurance required in this section, and if requested shall submit certificates for review and approval by the District. The Notice to Proceed shall not be issued, and GENERAL OR PROFESSIONAL SERVICE PROVIDER shall not commence work until such insurance has been approved by the District. The certificates shall be on forms approved by the District. Acceptance of the certificates shall not relieve GENERAL OR PROFESSIONAL SERVICE PROVIDER of any of the insurance requirements, nor decrease the liability of GENERAL OR PROFESSIONAL SERVICE PROVIDER. The District reserves the right to require GENERAL OR PROFESSIONAL SERVICE PROVIDER to provide insurance policies for review by the District.

For any coverage that is provided on a claims-made coverage form (which type of form is permitted only where specified) the retroactive date must be shown and must be before the date of this Agreement, and before the beginning of any Services related to this Agreement.

The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is

broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the Contractor.

C. Workers Compensation Insurance

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall take out and maintain during the life of the Agreement Workers Compensation Insurance for all of its employees on the project. In lieu of evidence of Workers Compensation Insurance, the District will accept a Self-Insured Certificate from the State of California. GENERAL OR PROFESSIONAL SERVICE PROVIDER shall require any subcontractor to provide it with evidence of Workers Compensation Insurance.

D. Professional Liability Insurance (Errors and Omissions)

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall maintain during the life of the agreement professional liability insurance with a minimum of $2,000,000/Occurrence. A three year tail is required if coverage on a claims-made basis. A deductible may be acceptable upon approval by the District. The policy will provide 30 days advance written notice to the District for cancellation or reduction in coverage. The Consultant shall require any subcontractor to provide evidence of the same professional liability insurance coverage.

E. Commercial General Liability Insurance

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall take out and maintain during the life of the Agreement Automobile and General Liability Insurance that provides protection from claims which may arise from operations or performance under this Agreement. If GENERAL OR PROFESSIONAL SERVICE PROVIDER elects to self-insure (self-fund) any liability exposure during the contract period above $50,000, GENERAL OR PROFESSIONAL SERVICE PROVIDER is required to notify the District immediately. Any request to self-insure must first be approved by the District before the changed terms are accepted. GENERAL OR PROFESSIONAL SERVICE PROVIDER shall require any subcontractor or Professional Service Provider to provide evidence of liability insurance coverages.

The amounts of insurance shall be not less than the following:

$2,000,000/Occurrence, Bodily Injury, Property Damage -- Automobile.
$2,000,000/Occurrence, Bodily Injury, Property Damage -- General Liability.

The following coverages or endorsements must be included in the policy(ies)*:*

1. The District, its Directors, officers, and employees are Additional Insureds in the policy(ies) as to the work being performed under the contract.

2. The coverage is *Primary and non-contributory* to any other applicable insurance carried by the District.

3. The policy(ies) covers *contractual liability*.

4. The policy(ies) is written on an *occurrence* basis.

5. The policy(ies) covers the District's Property in Consultant's care, custody, and control.

6. The policy(ies) covers *personal injury* (libel, slander, and wrongful entry and eviction) liability.

7. The policy(ies) covers explosion, collapse, and underground hazards.

8. The policy(ies) covers *products and completed operations.*

9. The policy(ies) covers the use of *owned, non-owned,* and hired automobiles.

10. The policy(ies) and/or a separate pollution liability policy(ies) shall cover pollution liability for claims related to the release or the threatened release of pollutants into the environment arising out of or resulting from Consultant's performance under this agreement.

11. The policy(ies) will not be canceled nor the above coverages/endorsements reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

The policy(ies) will not be canceled nor the above coverages/endorsements reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

E. Waiver of Subrogation Rights

Waiver of Subrogation. Contractor agrees to waive any and all rights of recovery against EBMUD regardless of applicability of any insurance proceeds and to require all indemnifying parties to do likewise. General and Automobile liability and Workers' Compensation policy(ies), including any applicable excess and umbrella insurance, must contain a waiver of subrogation endorsement providing that customer and each insurer waive any and all rights of recovery by subrogation, or otherwise, against the EBMUD, its directors, board and committee members, officers, officials, agents, volunteers, and employees. Customer shall defend and pay any and all damages, fees, costs, etc. arising out of or resulting from, customer's failure to provide the waiver of subrogation from the insurance carrier.

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EXHIBIT C
DETAILED SCOPE OF SERVICES

FOR

MAIN WASTEWATER TREATMENT PLANT HVAC AND BUILDING IMPROVEMENTS

Contact Person: Dominic La Marche, Assistant Civil Engineer
Phone Number: (510) 287-0779
E-mail Address: dominic.lamarche@ebmud.com

Table of Contents

SECTION 1 – PROJECT BACKGROUND, OBJECTIVES AND SCHEDULE

1.1 BACKGROUND

Overview

The East Bay Municipal Utility District (District) is a publicly-owned utility formed under the Municipal Utility District Act passed by the California Legislature in 1921. In 1944, voters decided to create Special District No. 1 to treat wastewater for six East Bay cities. Wastewater treatment began in 1951, with the District providing wastewater services for the cities of Alameda, Albany, Berkeley, Emeryville, Oakland, Piedmont, and the Stege Sanitary District, which includes El Cerrito, Kensington, and part of Richmond. The wastewater system serves approximately 685,000 people in an 88-square mile area. The wastewater system encompasses approximately 29 miles of sewer interceptors, seven miles of sewer force mains, 15 pumping stations, three wet weather facilities, and the Main Wastewater Treatment Plant (MWWTP).

Project Background

The Administration Building (AB), Laboratory (Lab), Dewatering Building (DWB), and the Operations Center Building (Ops Center) are located at the MWWTP in Oakland as shown in **Figure 1.**

Figure 1: Building Locations

The heating, ventilation, and air conditioning (HVAC) systems for these buildings have deficiencies and are in need of repair, replacement, and upgrades. The fire protection system within the AB, Lab, and Ops Center are also in need of updates.

AB and Lab Building: The AB and Lab were built at different times and support different activities; however, they are part of one connected building. The AB is the southern portion of the AB/Lab building and houses offices, meeting rooms, copy rooms, lounge, restrooms and an electrical room. The Lab is the northern portion of the AB/Lab complex and includes offices, locker/restrooms, cold rooms, gas cylinder storage room, hazardous materials handling, aquatic toxicology, microbiology, inorganic chemicals lab, bioassay lab, and other facilities.

The AB/Lab HVAC system includes a boiler, two chillers, chilled water and hot water distribution loops, 19 Air Handling Units (AHU), 16 exhaust fans, 16 fume hood exhaust fans, three condensing units, a heat pump, and two mini ductless split systems. The boiler is located at grade adjacent to the AB/Lab and all other equipment is located on the roof of the building. The main chiller (CH 1) provides most of the cooling while a secondary chiller provides cooling for laboratory equipment. A constant air volume (CAV) system is utilized to control temperature and ventilation in the building. Each AHU supplies air to one or more zones. Coil modules are located in the AHUs as well as in individual branches of the ducts. No return air is provided to rooms that house laboratory processes and equipment. Refer to **EXHIBIT D** for as built drawings of the HVAC system and a list of equipment. Note that due to the age of the as built drawings, they may not exactly reflect the existing system. An aerial image of the AB/Lab roof is provided **Figure 2**.

Figure 2: AB/Lab roof

The fire protection system in the AB/Lab includes a Halon system for the electrical room and some sprinkler systems for a portion of the Lab. **EXHIBIT E** provides a description of some of the fire protection systems present at the AB/Lab. The roof of this building is a built-up roof with rigid insulation and a vapor barrier.

Dewatering Building: The DWB houses wastewater solids treatment processes and equipment including chemical storage tanks, a digested sludge holding tank, sludge pumps, sludge cake pumps, dewatering centrifuges, gravity belt thickeners, and ancillary electrical and control equipment. The building is split into two areas; the northern portion of the building houses the sludge thickening facilities, and the southern portion houses the digested sludge dewatering facilities. The building is supported by a ventilation system providing air changes for the open process areas, a foul air system that serves individual process equipment including the centrifuges, and separate HVAC systems that serve occupied spaces and electrical rooms. This project will not address the foul air system.

Ventilation is provided by wall mounted supply fans for the first floor of the thickening facility, roof mounted supply fans for the second floor, and an AHU for all floors of the DWB. Two roof mounted inline exhaust fans expels air from the DWB. A roof mounted air conditioning unit supplies cooling and ventilation to an electrical room on the first floor of the DWB. An offshoot of this duct supplies ventilation to the Dewatering Control

Room. A heat pump is used to control the temperature of this room. Other electrical rooms in the DWB have been retrofitted with ductless systems. The ductless systems are preferred as they reduce corrosion of electrical equipment due to corrosive constituents present in outside air. Refer to **EXHIBIT D** for as built drawings of the HVAC system. Note that due to the age of the as built drawings, they may not exactly reflect the existing system.

Operations Center: The Ops Center is made up of three levels including a basement, first floor, and mezzanine. The basement consists of a pump room and mechanical equipment room. The first floor houses offices, storage areas, lunch room, electrical equipment room, and restrooms. The mezzanine level includes storage facilities, mechanical room, restrooms, training rooms, control rooms, and offices.

HVAC for this building is provided by a variable air volume system consisting of two AHUs and a condensing unit, a heating boiler, exhaust fans, and 10 air terminal units. One of the air handling units provides heating and cooling and the other only provides ventilation. Halon fire protection systems are used for fire protection in the electrical and equipment rooms of this building. Refer to **EXHIBIT D** for as built drawings of the HVAC system. Note that due to the age of the as built drawings, they may not exactly reflect the existing system. This project will include evaluation of the HVAC systems and fire protection systems for the Ops Center, but does not currently include design or construction of upgrades to this building.

1.2 OBJECTIVES

This project will resolve deficiencies with the building's HVAC systems, upgrade fire protection systems, and address roof leaks in the AB/Lab. These deficiencies will be assessed and evaluated during the Predesign Phase and addressed by upgrades included in the three bid packages. Careful assessment and evaluation will be performed to ensure the recommended upgrades meet building requirements in a cost effective, reliable, and energy efficient way. The project will utilize as much existing equipment as feasible and the upgrades will be implemented in a way that minimizes disruption to the building occupants and processes.

SECTION 2 – SCOPE OF WORK

The District is seeking a consultant to provide engineering and design services for upgrades to the HVAC, fire protection, and roof systems, at the MWWTP. The project will involve three separate areas:

- AB/Lab,
- DWB, and
- Ops Center.

The major components of the Project will include a Condition Assessment and Alternatives Evaluation (Predesign), Preliminary Design Reports and Detailed Designs for each bid package, bid phase support, and engineering services during construction (ESDC). The Consultant will prepare a total of three bid packages, the first of which will include critical improvements to the AB/Lab. At a minimum, these improvements will include replacement of the CH 1 and replacement of the exhaust fans and vents for the Lab's metals analysis area. Bid Packages Two and Three will include the remainder of the recommended upgrades. The Final Design project scope may differ depending on the results of the Predesign Phase.

2.1 PROJECT OUTLINE

The Consultant will develop a Predesign Technical Memorandum (TM) for each of the three project areas following field investigations and discussions with plant staff. These TMs will document the condition of the HVAC systems, their controls, the fire protection system, roofing and other related building systems. The TMs will also include preliminary cost estimates, a sequencing strategy, and recommend specific improvements to mitigate issues the District is currently experiencing.

The Detailed Design will be comprised of three bid packages to address deficiencies at the AB/Lab and DWB. No capital improvements are currently planned for the Ops Center. The Consultant will produce a Detailed Design for Bid Package One with milestones including a Preliminary Design, 50% and 90% deliverables, and a Final Design. District comments for each stage will be incorporated into the next stage. Following completion of each Bid Package, the Consultant shall support in Bid Phase Services as well as ESDC.

Bid Packages Two and Three will be developed following completion of the design of the previous bid package. These packages shall be developed in the same way as Bid Package One including a Preliminary Design, Detailed Design, Bid Period Support, and ESDC.

2.2 SCOPE ITEMS

The scope items listed below constitute the work that will be done as part of the Predesign Evaluation and Design portions of the project. These items represent the District's current understanding of the issues and required improvements, however, additions or modifications to this scope may be required based on the results of the Predesign evaluations and input from the Consultant.

Administration/Laboratory Building

1. **HVAC Control Software and Management System**: The AB/Lab is currently controlled by an obsolete Honeywell FS90 Control System as depicted in **Figure 3**.

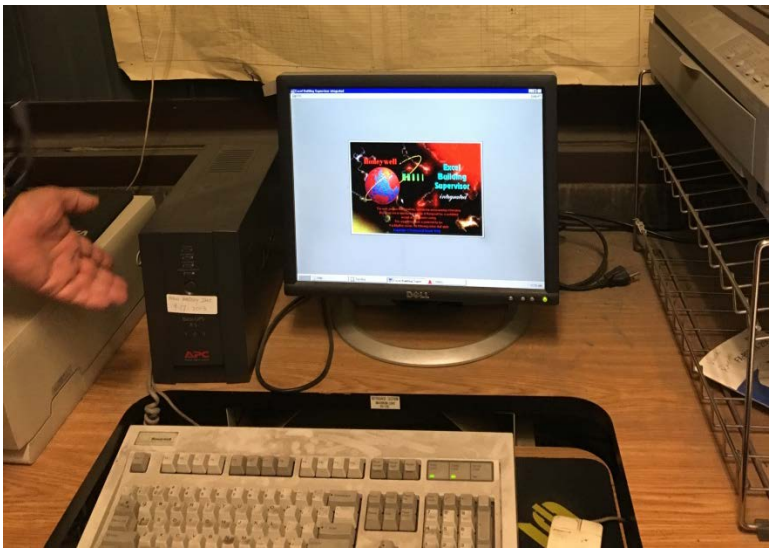

Figure 3: Existing HVAC Control Software

The Consultant shall design a new control system that minimizes installation costs by re-using existing conduits and field wiring where possible. The new control system shall integrate into the building management control systems currently used at the Ops Center and Maintenance Building (Syserco Alerton control equipment running on Niagara Framework). Any field investigations required for the design of upgraded control system shall be included in the Predesign phase of work. Evaluation of alternatives and recommended upgrades shall be included in the Predesign TMs.

2. **AB/Lab Cooling Systems:** The CH 1 provides cooling for the AB/Lab and has a rated capacity of 200 tons. The compressor was recently replaced but the chiller is nearing the end of its useful life. The Consultant shall design a cooling system to replace CH 1. Alternatives for replacing CH 1 shall be evaluated as part of the

Predesign. These alternatives can include: 1) Replace CH 1 with a new chiller to provide cooling for the entire AB/Lab. 2) Replace CH 1 with two chillers to provide a separate cooling system for the AB and the Lab facilities. 3) Use a combination of one new chiller and individual direct expansion units.

Additional alternatives can be considered at the discretion of the Consultant and District. The alternatives will be evaluated based on lifecycle cost, reliability, system flexibility, and system suitability for the intended use. The Consultant shall provide monitoring of the existing chiller and boiler to determine a baseline loading. Existing software may not have the functionality required to output this data. As part of sizing the new cooling system, Consultant shall also evaluate heat loads within the building and identify opportunities for reducing or eliminating these heat loads. Note that there is an ongoing maintenance project to replace lighting with LED.

3. **Temperature Fluctuations and Microclimates within the Lab**: Temperature fluctuations and microclimates have been observed in the Lab. Some of the laboratory processes and equipment have specific temperature requirements. During the Predesign Phase the Consultant will determine and document the root cause of the temperature fluctuations and microclimates. The improvements to the HVAC mechanical components and control systems, as designed by the Consultant, will address this issue.

4. **Metals Area Exhaust Fans and Vents:** The metals room has a fume hood exhaust fan that is corroding due to acidic fumes and condensation. The corrosion is shown in **Figure 4**.

Figure 4: Corroded Fume Hood Exhaust Vents

Leaks have formed in the exhaust ducting due to moisture and condensation collecting in the ducts, and leaking through the corroded material onto the floor or laboratory instruments. The Consultant shall specify and design a replacement for the corroded exhaust fan and ducting. The specified replacement will be of a material, or have a coating, to resist corrosion from the acidic fumes and condensation.

5. **Fire Protection System Compliance with Applicable Codes and Integration with HVAC:** The Consultant will identify the relevant codes and standards that apply to the building's fire protection system. As part of the Predesign, the Consultant shall survey the existing fire protection system and identify any deficiencies with respect to the applicable codes and building occupant safety. The Predesign will then provide recommendations for upgrades to the fire protection system to address these deficiencies. Recommended upgrades shall comply with District standards and practices for fire protection equipment. These Upgrades will be included in the design.

   A study was conducted in 2014 to evaluate the fire protection features provided for a limited number of spaces in the AB and the Ops Center. The study is included as **EXHIBIT E.** The results and recommendations of this report shall be considered during the Predesign Phase. The recommended improvements to the

HVAC system will incorporate fire protection features such as emergency automatic shutdown and smoke detection.

6. **Roof Improvements and Water Distribution System Leaks:** There are numerous leaks in the roof throughout the AB/Lab. These leaks are likely caused by poor seals at penetrations in the building roof. Some leaks could also be the result of leaking water distribution pipes in the interstitial space above the ceiling. The Consultant will identify the cause of the leaks, and recommend improvements during the Predesign Phase.

Figure 5: Roof Leaks in Laboratory Building

The Consultant shall specify repair for the roof to address the leaks and the repair will likely include the replacement of the entire roof. Additionally, the roof does not currently have any fall protection systems in place. The design provided by the Consultant will include addition of a fall protection system such as hand railings or increased parapet height.

7. **Indoor Air Quality for AB/Lab:** The Ab/Lab is located adjacent to wastewater processes that produce odors. The air intakes for the building HVAC system are located on the roof and pull odors into the building. These odors are noticeable and unpleasant for building occupants at times. The Predesign will include an evaluation of potential alternatives for reducing odors in the building. Potential alternatives include relocating intakes, improved filters on intakes, or increasing the roof parapet height. Carbon filters are currently used. If feasible, recommended upgrades to address indoor odor will be included in the design.

8. **Rehabilitation or Replacement of Other Mechanical Equipment:** Aging, corroded, poorly performing equipment, and mechanical equipment not included in the upgrades required for other scope items, shall be rehabilitated or replaced as needed to provide a functional system with limited required maintenance in the near term. All equipment evaluated in the Predesign (listed in Task 2.1) is also subject to rehabilitation or replacement as needed. The equipment list provided in **EXHIBIT D** notes some equipment that has recently been rehabilitated by previous maintenance projects.

Dewatering Building

9. **Ventilation and Circulation in Centrifuge Room:** Installation of new centrifuges in the DWB has resulted in an increase in observed odors. The Consultant will perform field investigations to characterize the ventilation and circulation within the Centrifuge Room and the Thickening Room. This investigation will determine air change rate and will identify any dead space in the rooms. The District would like the Consultant to investigate and propose ideas to improve the odor control inside these rooms. One concept the District would like to explore is displacement ventilation. **Figure 6** depicts the current arrangement of air intakes in the Centrifuge Room. Proposed upgrades, which could include modifications of ducting, fans, or other ventilation equipment, will be included in the design if feasible.

Figure 6: Suction air intakes in Centrifuge Room

10. **Temperature Control of Dewatering Control Room:** The Dewatering Control Room is located in the DWB and is often occupied by plant staff. The room is supplied with air conditioned from a package unit on the DWB roof that also supplies air to an electrical room below. The Dewatering Control Room therefore receives supply air at whatever temperature is required to keep the electrical room at an appropriate temperature. Additional temperature control is provided to the Dewatering Control Room using a heat pump; however, plant staff has found it challenging to maintain the desired temperature simultaneously in both the Dewatering Control Room and the electrical room. The Consultant shall design a new system that provides separate temperature and ventilation controls and would likely include a new rooftop unit that is dedicated to the Dewatering Control Room.

Operations Center Building

11. **Ventilation and Circulation within the Building:** The Consultant shall perform the necessary field investigation and testing to confirm ventilation in the building is sufficient to provide the required air changes. The Consultant shall also evaluate and document the condition of the two existing air handling units for the Ops Center.

12. **Fire Protection System Compliance with Applicable Codes and Integration with HVAC:** The Consultant will identify the relevant codes and standards that apply to the building's fire protection system. The evaluation will survey the existing fire protection system and any deficiencies with respect to the applicable codes and building occupant safety. The Consultant will provide recommendations for upgrades to the fire protection system to address the identified deficiencies.

2.3 ANTICIPATED CONSULTANT SERVICES

The Consultant shall perform the following tasks:

Task 1: Project Management

The Consultant shall coordinate engineering analysis and design work; prepare meeting agenda and minutes; attend meetings; manage quality control and assurance; prepare deliverables; and provide documents and invoices as necessary to effectively manage this project. The Consultant shall be responsible for project coordination and communication with the project team, sub consultants, and the District project manager to facilitate evaluation and development efforts.

The Consultant shall conduct a kickoff meeting along with other meetings and workshops with District staff, including representatives from maintenance, engineering, operations, and other divisions.

The following key meetings are anticipated:

- Project Kick-Off Meeting
- Environmental, Health, Safety, and Security Checklist Meeting
- *Predesign TM Discussion Meetings:*
    - AB/Lab Predesign Meeting
    - DWB Predesign Meeting
    - Ops Center Predesign Meeting

Bid Package One:

- Preliminary Design Workshop
- *50% Design Submittal*
    - User Group Meeting (one to two weeks after submittal)
    - Management Briefing (one to two weeks after User Group meeting)
- *90% Design Submittal*
    - User Group Meeting
    - Management Briefing
- Final Design Submittal Management Briefing

Bid Package Two:

- Preliminary Design Workshop
- *50% Design Submittal*
    - User Group Meeting (one to two weeks after submittal)
    - Management Briefing (one to two weeks after User Group meeting)
- *90% Design Submittal*
    - User Group Meeting
    - Management Briefing
- Final Design Submittal Management Briefing

Bid Package Three:

- Preliminary Design Workshop
- *50% Design Submittal*
    - User Group Meeting (one to two weeks after submittal)
    - Management Briefing (one to two weeks after User Group meeting)
- *90% Design Submittal*
    - User Group Meeting

    - Management Briefing
- Final Design Submittal Management Briefing

The Consultant shall prepare an overall project schedule and update it on a monthly basis. The Consultant shall create and maintain an Issues and Decisions Log, prepare monthly project status reports and invoices, and coordinate deliverables. The Consultant shall submit all deliverables in both draft and final forms according to the following submittal requirements:

Draft Deliverable: The consultant shall prepare draft documents, each of which shall include the task-required information. The Consultant shall provide up to eight hard copies and one electronic copy (in PDF format) of each draft document. The Consultant shall allow two weeks for the District to review and provide comments on the Technical Memoranda and three weeks for the District to review and provide comments on design submittals.

Final Deliverable: The Consultant shall prepare final documents, addressing and incorporating comments received from the District on the draft versions. The Consultant shall provide up to eight hard copies of each final document. The Consultant shall also include an electronic (PDF) of each document, and each document in its source file format. Deliverables for the Detailed Design Phase under Task 4 which include drawings and specifications do not require draft and final deliverables for each submittal.

All submittals by the Consultant shall undergo an internal quality assurance/quality control review prior to submission to the District.

Task 1.1 Kick-Off Meeting

A comprehensive kickoff meeting will be conducted with District staff and consultant staff. The purpose of the meeting is to confirm the understanding of the scope, review previous relevant work conducted by the District and previous consultants, identify outstanding issues and decisions, identify potential risks and mitigations, discuss the project schedule, and discuss coordination protocol between the Consultant and District.

Deliverable: The Consultant shall prepare an agenda for the meeting, presentation slides as needed, meeting minutes following the meeting, and a decision and action item log.

Task 2: Predesign

The Predesign task will include condition assessments, evaluation of project alternatives, and alternative recommendations. The condition assessments will include any necessary field investigations, field measurements, and discussions with plant staff to characterize the specified systems. The focus of the condition assessment will be on the scope items listed in **Section 2.2**, however, the condition assessment will not be limited to these items.

Following the condition assessment, a set of alternatives will be developed to mitigate the issues identified in this document and any additional issues discovered during the field investigation. Alternatives may include replacement of equipment, rehabilitation of equipment, or other upgrades to address the issues. The alternatives will be evaluated based on lifecycle cost, reliability, system flexibility, and system suitability for the intended use. The Predesign will include a recommendation of the preferred alternative. Planning level costs will be developed for the selected alternatives. Construction sequencing strategies are a critical component of the Predesign TM. It is crucial that disruptions to the AB/Lab are minimized during construction of the required improvements. The Predesign TMs will include detailed discussion of construction sequencing strategies for the selected alternatives.

Task 2.1: Administration/Laboratory Building Predesign

The AB and Lab house different facilities, however, they are interconnected and will be evaluated together. The following facilities, equipment, and systems will be evaluated as part of the Predesign for the AB/Lab:

- Main chiller
- secondary chiller
- boiler
- chilled water distribution system
- hot water distribution system
- coil modules
- air handler units
- exhaust fans
- fume hood exhaust fans
- duct work
- dampers
- condensing units
- heat pumps
- split systems

- HVAC control system
- roofing system
- building fire protection system
- all ancillary electrical and control equipment

Chilled water piping, hot water piping, coil modules, dampers, and ducts shall be assessed in multiple locations throughout the building to adequately characterize the condition of the entire systems.

At a minimum, the Predesign will address the scope items for the AB/Lab, listed in **Section 2.2**.

Deliverable: The Consultant shall prepare a standalone draft and final TM for the Predesign work for the AB/Lab. At a minimum, the TM will include the following components:

- Results of condition assessment
- Alternatives evaluation
- Recommended alternatives
- Preliminary cost estimate for selected alternatives
- Preliminary construction sequencing strategy for selected alternatives

The TM shall be issued in draft form prior to a workshop discussing the results. The Consultant shall prepare workshop agenda and slides to summarize results and recommendations from Predesign TM on the AB/Lab.

Task 2.2: Dewatering Building Predesign

The following facilities, equipment, and systems will be evaluated as part of the Predesign for the DWB:

- air handler units
- ducting
- air conditioning units
- heat pumps
- HVAC management system
- all ancillary electrical and control equipment.

The Predesign will include necessary analysis and measurements to determine the air changes within each room of the DWB and characterize airflow throughout the building. At a minimum, the Predesign will address scope items for the DWB, listed in **Section 2.2**.

Deliverables: The Consultant shall prepare a standalone draft and final TM for the Predesign work for the DWB. At a minimum, the TM will include the following components:

- Results of condition assessment
- Alternatives evaluation
- Recommended alternatives
- Preliminary cost estimate for selected alternatives
- Preliminary construction sequencing strategy for selected alternatives

The TM shall be issued in draft form prior to a workshop discussing the results. The Consultant shall prepare workshop agenda and slides to summarize results and recommendations from Predesign TM on the DWB.

Task 2.3 Operations Center Building Predesign

The following facilities, equipment, and systems will be evaluated as part of the Predesign for the Ops Center:

- air handler units
- ducting
- direct expansion units
- heat pumps
- HVAC management system
- building fire protection system
- all ancillary electrical and control equipment.

The Predesign will include necessary analysis and measurements to determine the air changes within each room of the Ops Center and characterize airflow throughout the building. At a minimum, the Predesign will address the scope items for the Ops Center, listed above in **Section 2.2**.

Deliverable: The Consultant shall prepare a standalone draft and final TM for the Predesign work for the Ops Center. At a minimum, the TM will include the following components:

- Results of condition assessment
- Alternatives evaluation
- Recommended alternatives
- Preliminary cost estimate for selected alternatives
- Preliminary construction sequencing strategy for selected alternatives

The TM shall be issued in draft form prior to a workshop discussing the results. The Consultant shall prepare workshop agenda and slides to summarize results and recommendations from Predesign TM on the Ops Center.

Task 2.4: Environmental, Health, Safety, and Security Compliance Checklist
The District will prepare an Environmental, Health, Safety, and Security Compliance Checklist (Checklist) with support from the Consultant. The Consultant shall attend a mandatory meeting with the District's Regulatory Compliance Office to discuss the information required for the Checklist.

Deliverable: The Consultant shall prepare an agenda for the Checklist Meeting, presentation slides as needed, meeting minutes following the meeting, and a decision and action items log. Specification stating requirements, as determined by the District following the completing of the checklist, will be included in the scope under Task 4: Detailed Design.

Tasks 3 through 5 – Detailed Design
The project will include the Detailed Designs of the upgrades recommended in the Predesign TMs. One design package shall be prepared for each of the three Bid Packages. The work shall include, at a minimum, process/mechanical, structural, architectural, electrical, and instrumentation and controls (I&C) design.

Design services shall include preparation of any necessary calculations, engineered drawings/plans, and technical specifications required to communicate to the construction contractor the facilities that are to be constructed. Technical specifications shall be prepared by the Consultant in the modified Construction Specifications Institute format and shall be submitted in both Word document and PDF formats. Design drawings shall be submitted to the District in MicroStation format to comply with the District's Wastewater Department Computer Aided Design and Drafting (CADD) Standard Guidelines. PDF copies shall be submitted as well. Process and Instrumentation Drawings (P&IDs), equipment lists, and instrumentation lists shall be prepared using MS Excel software, to comply with the CADD Standard Guidelines. Contract (i.e. "front end") specifications shall be generated by the District.

Design services shall also include preparation of any documents or materials needed for permit compliance including but not limited to City of Oakland Building Permit and California Energy Commission Title 24 Building Energy Efficiency requirements.

Requirements for the specific design discipline areas are as follows:

Structural: The Consultant shall prepare drawings and specifications for structural and seismic design elements including but not limited to equipment anchorages. The Consultant shall confirm that existing structures can support new equipment and

sustain operating loads, earthquake forces, and life safety design criteria in accordance with District standards, Universal Building Code, America Concrete Institute Manual of Practice, Steel Design Manual, and any other applicable code requirements.

Architectural: The Consultant shall prepare architectural renderings, plan, sections, roof plans, and details for the building upgrades as needed.

Process/Mechanical: The Consultant shall prepare the design of process mechanical facilities, including HVAC, equipment, piping, and other service utilities and appurtenances. Process/Mechanical design shall comply with latest NFPA code requirements as well as California Energy Commission Title 24 Building Energy Efficiency requirements.

Electrical: The Consultant shall prepare the detailed electrical design based on the latest NEC and California Electric Codes.

Instrumentation and Controls (I&C): Instrumentation design includes the design of equipment control systems and all required instrumentation to facilitate those controls. The Consultant shall prepare I&C designs including control narratives and control strategies. Control strategies shall be prepared to describe Programmable Logic Controller (PLC) functions. I&C devices shall be shown on the mechanical and electrical plans. An instrumentation index and an input/output list shall be prepared by the Consultant. Instrument and equipment tag numbers shall conform to District standards while wiring and loop diagrams shall be fully detailed for construction. Consultant shall work with District Staff to ensure communications systems meet network security requirements.

Drafting: The Consultant shall provide all drafting services for this project. The Consultant shall conform to District Wastewater CADD and drawing development standards. These standards shall be provided by the District prior to the initiation of any drafting work. The District will also provide any available drawing backgrounds to be used in drawing development. The Consultant shall not modify or alter these backgrounds.

Task 3 – Bid Package One Detailed Design

The exact scope of Bid Package One is subject to change based on the results of the Predesign TM, however, it is currently assumed that Bid Package One will include replacement of the CH 1 on the AB/Lab and replacement of the corroded fume hood exhaust fan and duct serving the metals room.

Task 3.1 Bid Package One Preliminary Design

The Consultant shall do all work necessary to prepare a complete Preliminary Design Report that defines the following:

- Scope of work for Final Design and description of recommended design project
- Design objectives
- Design criteria
- General arrangement drawings of new and retrofitted facilities
- Equipment sizing and functional calculations
- Preliminary equipment selection and allowable vendors
- Vendor catalog cuts for major equipment
- List of outside agency permits for District application
- Preliminary construction cost estimate
- List of drawings
- List of specifications
- Potential project constraints, including evaluation of:
    - Outage requirements
    - Sequencing requirements during construction

Deliverable: The Consultant shall prepare draft and final versions of the Preliminary Design Reports. The Consultant shall keep a review comments log documenting all District comments, the Consultant's responses to those comments, and changes made to the final version of the Report as a result of those comments.

Task 3.2: Bid Package One 50% Design Submittal

The 50% Design Submittal shall include the following at a minimum:

- Title page with drawing list
- All drawings to scale and with appropriate dimensions shown
- Design criteria and major equipment list
- Architectural plans, sections, details, and layouts
- Process/Mechanical plans with key sections and details
- Structural plans and sections (as applicable)
- Electrical plans and single line diagram
- Complete P&IDs
- Control strategy descriptions
- Temporary facilities during construction
- Major technical equipment specifications

- 50% level construction cost estimate
- Updated project sequencing and implementation schedule

Deliverable: The Consultant shall prepare 50% Design Submittals. The Consultant shall keep a review comments log, documenting all District comments, the Consultant's response to those comments, and changes made to the Design submittal as a result of those comments.

Task 3.3 Bid Package One 90% Design Submittal
The 90% Design Submittal shall include the following:

- Final drawings (plans, sections, details, diagrams, P&IDs) for all discipline areas
- Final specifications including complete front-end specifications (Division 00 and 01 provided by the District) with assistance from the Consultant to identify project constraints and special procedures in the front-end specifications
- Updated 90%-level construction cost estimate
- Updated project implementation schedule
- TM with completed control strategies and detailed analog loop descriptions
- Any relevant engineering calculations
- TM with recommendations for bidding, special project constraints, construction inspection, startup, and testing for the project identifying any specialized inspection, factory acceptance testing, field testing, special warranty inspections, etc. and other topics that would aid in developing the front-end specifications

Deliverable: The Consultant shall prepare 90% Design Submittals. The consultant shall keep a review comments log, documenting all District comments, the Consultant's responses to those comments, and changes made to the Design as a result of those comments.

Task 3.4: Bid Package One Final Design Submittal
The Final Design Submittal shall include the following:

- Incorporation of User Group and Management comments from the 90% design.
- All final drawings and specifications, cost estimate, and implementation schedule.

- Final Design Management briefing

Deliverable: The Consultant shall prepare final Design Submittals. The Consultant shall keep a review comments log, documenting all District comments, the Consultant's responses to those comments, and changes made to the Final Design Submittal as a result of those comments. The Consultant shall prepare agenda, presentation slides, and meeting minutes from the Final Design Management briefing. The Consultant shall record all decisions made at the briefing and create an action item log that will be incorporated into the contract documents following the meeting, as applicable.

Task 4: Bid Package Two Detailed Design

The exact scope of Bid Package Two is subject to change based on the results of the Predesign TM, however, it is currently assumed that Bid Package Two shall include upgrades to the AB/Lab recommended in the Predesign TMs but not implemented in Bid Package One. These upgrades include updating the HVAC management software, replacement or refurbishment of AHUs and other HVAC equipment, upgrades to building fire protection system, upgrades to the roof and piping to address leaks, and upgrades to address indoor air quality in AB/Lab.

Task 4.1 Bid Package Two Preliminary Design

See requirements for Task 3.1

Task 4.2 Bid Package Two 50% Design

See requirements for Task 3.2

Task 4.3 Bid Package Two 90% Design

See requirements for Task 3.3

Task 4.4 Bid Package Two Final Design

See requirements for Task 3.4

Task 5: Bid Package Three Detailed Design

The exact scope of Bid Package Three is subject to change based on the results of the Predesign TM; however, it is currently assumed that Bid Package Three shall include upgrades to the DWB as recommended in the Predesign TM. These upgrades include separation of temperature control of the Dewatering Control Room and Electrical Room, ventilation, and ducting upgrades to the centrifuge room.

Task 5.1 Bid Package Two Preliminary Design

See requirements for Task 3.1

Task 5.2 Bid Package Two 50% Design
See requirements for Task 3.2

Task 5.3 Bid Package Two 90% Design
See requirements for Task 3.3

Task 5.4 Bid Package Two Final Design
See requirements for Task 3.4

Task 5: Bid Period Services
The Consultant shall attend pre-bid meetings and respond to questions from prospective bidders as requested by the District, and will prepare meeting notes and addenda as necessary. The Consultant shall also review and reply to equipment substitution requests from prospective bidders as requested by the District. The District will print and distribute any addenda produced during the bid period.

Task 6: Engineering Services during Construction
The Consultant shall provide ESDC for the project, including the following items:

- **Issue Resolution** – This service will involve responding to Requests for Information from the Contractor. The Consultant shall issue necessary clarifications, interpretations, and re-design of the Contract documents, as appropriate for the orderly completion of the work.
- **Submittal Review** – The Consultant shall review (or take other appropriate action in respect of) shop drawings, material and equipment data sheets, engineering calculations, and other data which the Contractor is required to submit per the Contract Documents.
- **Change Order Assistance** – The Consultant shall design, review, and consult with the District on change orders to the Contract Documents.
- **Quality Control Monitoring and Site Visits** – The Consultant shall conduct periodic site visits for observational purposes during construction.
- **Start-Up Assistance and Standard Operation Procedures (SOPs)** – The Consultant shall assist the Contractor to perform system testing. Assistance will include electrical and control system installation and related work. The Consultant shall also prepare Updated SOPs for the facility for Operations staff.
- **Schedule Review and Analysis** – The Consultant shall assist the District in reviewing the Contractor's baseline schedule and subsequent updates and final schedule.

- **Operations and Maintenance (O&M) Manual Support** – The Consultant shall prepare and submit O&M manuals to the District.
- **Record Drawings** – At the completions of the project, the Consultant shall prepare and submit Final Record Drawings to the District.

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EXHIBIT D
REFERENCE DRAWINGS AND EQUIPMENT LIST

FOR

MAIN WASTEWATER TREATMENT PLANT HVAC AND BUILDING IMPROVEMENTS

Contact Person: Dominic La Marche, Assistant Civil Engineer
Phone Number: (510) 287-0779
E-mail Address: dominic.lamarche@ebmud.com

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EAST BAY MUNICIPAL UTILITY DISTRICT

SD-185 LABORATORY EXPANSION — BID & CONSTRUCTION

ED2 International

JULY 29, 1991

USER: RGA
DATE: 1-16-96
PLOT: H:\ERD\SD185\GENERAL\T1.1.DGN

Issuances and Revisions

No.	Date	Description
0	1-15-96	ISSUED FOR CONSTRUCTION
	9-13-94	AS BUILT
	1-16-96	AS BUILT 28 AUG 1994

Date 7/29/91

Sheet Title

COVER SHEET

Project No. 9002

T1.1 Sheet No. 1/15

0 Revision

ABBREVIATIONS*

A	AIR	F.A.	FIRE ALARM	N.	NORTH	T.	TREAD
A.B.	ANCHOR BOLT	F.D.	FLAT DUCT	NO.	NUMBER	TEL.	TELEPHONE
A.C.	ASPHALT CONCRETE	F.D.	FLOOR DRAIN	N.I.C.	NOT IN CONTRACT	TEMP.	TEMPORARY
ACOUS.	ACOUSTIC	FDN.	FOUNDATION	NO.	NUMBER	TEXT.	TEXTURE
ADJ.	ADJUSTABLE/ADJACENT	F.E.	FIRE EXTINGUISHER	NOM.	NOMINAL	T. & G.	TONGUE AND GROOVE
A.F.S.	ACOUSTICAL FINISH SLAB	F.F.	FINISH FLOOR	N.T.S.	NOT TO SCALE	THK.	THICK OR THICKNESS
ALUM.	ALUMINUM	F.F.D.	FLUSH FLOOR DRAIN			T.O.	TOP OF
ALT.	ALTERNATE	F.G.	FINISH GRADE			T.O.C.	TOP OF CURB
ANOD.	ANODIZED	F.H.N.S.	FLAT HEAD MACHINE SCREW	O.A.	OVERALL	T.P.D.	TOILET PAPER DISPENSER
A.P.	ACCESS PANEL			O.C.	ON CENTER		
APPROX.	APPROXIMATE	FIN.	FINISH	O.D.	OUTSIDE DIAMETER	TYP.	TYPICAL
ASP.	ASPHALT	FIXT.	FIXTURE	OFC.	OFFICE		
		FLR.	FLOOR	O.H.	OPPOSITE HAND		
		FLUOR.	FLUORESCENT	O.H.S.M.S.	OVERHEAD SHEET METAL SCREW	U.O.C.	UNIFORM BUILDING CODE
BD.	BOARD	F.M.D.	FEMININE HYGIENE DISPOSAL	OPNG.	OPENING	U.O.N.	UNLESS OTHERWISE NOTED
BET.	BETWEEN	F.N.V.	FEMININE HYGIENE VENDOR	OPP.	OPPOSITE	U.S.	UNITED STATES
BITUM.	BITUMINOUS						
BLDG.	BUILDING	F.O.S.	FACE OF STUD	P	PAINT		
BLK'G.	BLOCKING	F.O.W.	FACE OF WALL	PART.	PARTITION		
C.I.	CAST IRON	FPRF.	FIREPROOF	P.B.	PULL BOX	V.	VACUUM
CGT.	COTTON	FR.	FRAME	PERF.	PERFORATED	V.C.T.	VINYL COMPOSITION TILE
B.R.F.	COTTON OF ROOF FRAMING	F.S.	FINISH SURFACE	PF.	PREFINISHED		
		FTG.	FOOTING	PG & E	PACIFIC GAS & ELECTRIC	VEN.	VENEER
CAD.	CADMIUM	FURN.	FURNISH			VENT'G.	VENTING
C.D.	CONCRETE CLOCK	FXD.	FIXED	PL.	PLATE	VER.	VERIFY
C/C	CENTER TO CENTER			P.L.	PROPERTY LINE	VERT.	VERTICAL
CEN.	CENTER	G.	GAS	PLAS.	PLASTER OR PLASTIC	VEST.	VESTIBULE
CER.	CERAMIC	GA.	GAUGE	PLMG.	PLUMBING		
CHLOR.	CHLORIDE	GALV.	GALVANIZED	PLYWD.	PLYWOOD	W	WIDE
C.J.	CONTROL JOINT	GEN.	GENERAL	POL.	POLISHED	W/	WITH
C.L.	CHAIN LINK	GL.	GLASS	PR.	PAIR	W.C.	WATER CLOSET
CLG.	CEILING	GLU-LAM.	GLUE LAMINATE	PREFAB.	PREFABRICATED	WD.	WOOD
CLR.	CLEAR	GYM.	GYMNASIUM	PROJ.	PROJECT OR PROJECTION	W.F.	WIDE FLANGE
C.M.U.	CONCRETE MASONRY UNIT	GYP. BD.	GYPSUM BOARD	P.T.D.	PAPER TOWEL DISPENSER	WIND.	WINDOW
CNTR.	COUNTER			PT.	POINT	W.O.	WHERE OCCURS
CONC.	CONCRETE	H	HIGH			W.P.	WATERPROOF
CONST.	CONSTRUCTION	HD.	HANDRAIL			W.R.	WATER RESISTANT/ WASTE RECEPTACLE
CONT.	CONTINUOUS	H.B.	HOSE BIB	R	RADIUS / RISER	WSCT.	WAINSCOT
CT.	CERAMIC TILE	H.C.	HOLLOW CORE/ HANDICAPPED	RD.	ROUND	WT.	WEIGHT
CTR.	CENTER	HDWD.	HARDWOOD	R.D.	ROOF DRAIN		
CTSNK.	CONSTRUCTION	HDWR.	HARDWARE	REQ'D.	REQUIRED		
CNTRP.	COUNTERTOP	H.M.	HOLLOW METAL	RESIL.	RESILIENT	&	AND
		HORIZ.	HORIZONTAL	R.H.	RACE HOOK	∠	ANGLE
		H.P.	HIGH POINT	RM.	ROOM	@	AT
COL.	CONDUIT	H.P.L.	HIGH PRESSURE LAMINATED	R.O.	ROUGH OPENING	℄	CENTER LINE
DEPRS.	DEPRESSED			RUB.	RUBBER	Ø	DIAMETER
DET.	DETAIL	HR.	HOUR	REDWD.	REDWOOD		
D.F.	DOUGLAS FIR/ DRINKING FOUNTAIN	HT.	HEIGHT	RWL.	RAIN WATER LEADER		
DIA.	DIAMETER						
DIAG.	DIAGONAL	I.D.	INSIDE DIAMETER	S	STEEL		
DIM.	DIMENSION	INSUL.	INSULATION	S.A.D.	SEE ARCHITECTURAL DRAWINGS		
DISP.	DISPENSER						
DN.	DOWN	J	JOINT	S.C.	SOLID CORE		
D.O.	DOOR OPENING	JAN.	JANITOR	SCHED.	SCHEDULE		
DR.	DOOR	JT.	JOINT	S.D.	STORM DRAIN		
				SECT.	SECTION		
(E)	EXISTING	KD.	KNOCKDOWN	S.H.	SPRAY HOSE		
EA.	EACH	K/S	KNEE SPACE	SH.	SHELF		
E.I.F.S.	EXTERIOR INSULATION & FINISH SYSTEM			SHT.	SHEET		
		LAM.	LAMINATE	SHT'G.	SHEATHING		
EL.	ELEVATION	LAV.	LAVATORY	SIM.	SIMILAR		
ELECT.	ELECTRICAL	LB.	POUND	SL.	SLOPE		
E.P.S.	ELECTRICAL PANEL BOARD	LT.	LIGHT	S.L.	SKYLIGHT		
EQ.	EQUAL			SPECS.	SPECIFICATIONS		
EQUIP.	EQUIPMENT			SQ.	SQUARE		
ETC.	ETCETERA	MACH.	MACHINE	S.S.	STAINLESS STEEL		
EXP.	EXPANSION	MAT'L	MATERIAL	STL.	STEEL		
EXPOS.	EXPOSED	MAX.	MAXIMUM	STD.	STANDARD		
EXT.	EXTERIOR	M.B.	MACHINE BOLT	STOR.	STORAGE		
		MECH.	MECHANICAL	STRUCT.	STRUCTURAL		
		MECH.	MECHANIC	SURF.	SURFACE		
		MTL.	METAL	SUSP.	SUSPENDED		
		MT'L./MTL.	MANUFACTURING	SYS.	SYSTEM		
		MFR.	MANUFACTURER				
		MIN.	MINIMUM				
		MISC.	MISCELLANEOUS				
		M.O.	MASONRY OPENINGS				
		MTD.	MOUNTED				
		MUL.	MULLION				

* REFER TO SHEET A3.1 FOR LABORATORY ABBREVIATIONS USED ON THE 1/4" SCALE FLOOR PLANS

SYMBOL LEGEND

- SECTION CUT MARKER
- DRAWING SHEET NUMBER
- INTERIOR ELEVATION GROUP NUMBER
- SPECIFIC ELEVATION
- DRAWING SHEET NUMBER
- EXTERIOR ELEVATION MARKER
- DRAWING SHEET NUMBER
- ENLARGED PLAN ELEVATION, OR SECTION MARKER
- AREA ENLARGED
- DRAWING SHEET NUMBER
- DETAIL MARKER
- DRAWING SHEET NUMBER
- DOOR MARK DOOR TYPE LETTER (REFER TO DOOR SCHEDULE)
- FRAME MARKER (REFER TO DOOR SCHEDULE) HARDWARE GROUP LETTER
- EXISTING COLUMN GRID LINE REFERENCE NUMBER
- NEW COLUMN GRID LINE REFERENCE NUMBER
- WINDOW TYPE
- LOUVER TYPE
- REVISION MARKER
- PARTITION DETAIL TYPE
- DOOR MARKER
- SHELL FINISH
- WALL / BASEBOARD FINISH
- FLOOR / CASE FINISH
- SHELL HEIGHT
- REVISION NUMBER
- ADDENDUM NUMBER
- EQUIPMENT NUMBER SHOWN ON 1/4" FLOOR PLANS. REFER TO SECTION 11000 "EQUIPMENT RESPONSIBILITY" IN SPECIFICATIONS

MATERIAL LEGEND

- CONTINUOUS BLOCKING OR SHIM
- BLOCKING OR SHIM
- EARTHWORK
- CONCRETE
- BATT INSULATION
- RIGID INSULATION
- CERAMIC TILE
- METAL
- BRICK TILE PAVER
- CEILING BOARD
- ASPHALT PAVING
- PLYWOOD
- PLASTER/LATH

USER: RGA
DATE: 1-18-96
FILE: J:\0092\SHEETS\GENERAL\T1.2.DGN

GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE CURRENT REGULATIONS OF THE EAST BAY MUNICIPAL UTILITY DISTRICT (EBMUD) SPECIFICATIONS, THE UNIFORM BUILDING CODE, 1994 EDITION AND THE LATEST EDITION OF ALL OTHER APPLICABLE LOCAL, STATE AND FEDERAL CODES AND ORDINANCES.

2. PROVIDE ALL NECESSARY PERSONNEL, EQUIPMENT AND TEMPORARY BARRICADES TO PROTECT THE PUBLIC DURING EXCAVATION, CONSTRUCTION AND DEMOLITION WORK. PROTECT STRUCTURES, SIDEWALKS, PAVEMENTS, FENCES, CROPS, AND OTHER FACILITIES WITHIN OR ADJACENT TO THE CONSTRUCTION SITE AND INCIDENTAL PROPERTIES FROM DAMAGE DUE TO SETTLEMENT, UNDERMINING, WASH, OR OTHER HAZARDS CREATED BY EARTHWORK AND DEMOLITION OPERATIONS. MAINTAIN ALL CROSS MARKS, MONUMENTS AND OTHER REFERENCE POINTS. REPAIR TO EBMUD STANDARDS ANY CURBS OR CRACKED SIDEWALK, GUTTER, AND SITE UTILITIES DAMAGED BY EARTHWORK OPERATIONS.

3. THE CONTRACTOR SHALL TAKE MEASURES TO PREVENT SUBSIDENCE OR SETTLEMENT OF EXISTING STRUCTURES. PROVIDE AND PLACE SHORING OR BRACING AND BE RESPONSIBLE FOR SAFETY AND SUPPORT OF STRUCTURES. ASSUME LIABILITY FOR SUCH MOVEMENT, SETTLEMENT, DAMAGE, OR INJURY.

4. THE CONTRACTOR SHALL VERIFY AND IDENTIFY ALL UTILITIES, DUCTS, CONDUITS AND OTHER SERVICES IN THE PATH OF NEW AND ALTERED WORK. RE-ROUTE ALL SERVICES OR PORTIONS OF SERVICES IN THE PATH OF THE NEW AND ALTERED WORK AND PROVIDE FOR COMPATIBILITY WITH NEW AND ALTERED WORK. WHERE EXISTING WIRE HOLDING CONDUITS, AND JUNCTION BOXES, ETC., ARE EXPOSED AT EXISTING WALLS OR FURRING, UNLESS OTHERWISE NOTED, WHERE EXISTING LIGHT SWITCHES, CONDUITS AND OUTLETS ARE TO BE RELOCATED, LOCATE INTO LOCATIONS INTO WALLS, U.O.N. PATCH AND REPAIR FINISHES TO MATCH EXISTING.

5. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS AND ELEVATIONS SHALL ALWAYS TAKE PRECEDENCE OVER SCALED DIMENSIONS. INFORM THE ENGINEER OF ANY DISCREPANCIES.

6. DIMENSIONS SHOWN ON FLOOR PLAN ARE TO FACE OF FINISH OR CONCRETE, UNLESS OTHERWISE NOTED OR INDICATED.

7. VERIFY ALL DIMENSIONS, ELEVATIONS AND LOCATIONS OF NEW CONSTRUCTION WITH EXISTING WALLS, FLOOR, COLUMNS AND FURRING.

8. WHERE INDICATED ON PLANS, ALIGN NEW WALLS WITH THE OUTSIDE FACE OF EXISTING WALLS. COLUMNS AND FURRING FOR A FINISHED REPAIR. PATCH AND FINISH WALLS WHERE ABUTS NEW WALLS.

9. UNLESS SPECIFICALLY NOTED TO BE REMOVED, EXISTING CONSTRUCTION SHALL REMAIN. VERIFY WITH DEMOLITION, PHASING PLANS AND NEW CONSTRUCTION AS INDICATED IN THE DRAWINGS.

10. STRUCTURAL PLANS GOVERN FOR SIZES, SPACING, AND CONNECTIONS OF ALL STRUCTURAL MEMBERS AND MEMBERS. IN CASE OF DISCREPANCIES, CONSULT WITH ENGINEER BEFORE COMMENCEMENT OF WORK.

11. ANY ITEM DESCRIBED IN THESE DRAWINGS WITHOUT A "NEW" OR (N) EXISTING (E) DESIGNATION SHALL BE CONSIDERED NEW.

12. EXISTING BUILDING DIMENSIONS, ELEVATIONS, AND CONDITIONS AS SHOWN ON THE (E) PLANS MAY DIFFER. FIELD VERIFY. THE CONTRACTOR IS RESPONSIBLE FOR THE VERIFICATION OF ALL DIMENSIONS AND ELEVATIONS BOTH EXISTING AND NEW. WHERE FIELD CONDITIONS PRECLUDE THE INSTALLATION OF NEW CONSTRUCTION AS INTENDED, I.E. ROUGH-IN PLUMBING, THE CONTRACTOR WILL BE RESPONSIBLE AT NO ADDITIONAL COST TO ENSURE THAT RELATED WORK SEQUENTIAL TO THIS DIMENSIONALLY ADJUSTED CONSTRUCTION, I.E. MODULAR CASEWORK, WILL FIT FOR A COMPLETE AND WORKABLE INSTALLATION.

13. PROVIDE BLOCKING AND BACKING FOR ALL WALL-HUNG FIXTURES, ACCESSORIES, GRAB BARS, BUMPER RAILS, SEISMIC RESTRAINTS, ETC. AND AS NOTED IN THE CONSTRUCTION DOCUMENTS.

14. FASTENER ATTACHMENTS ONTO EXISTING CONCRETE AND CMU WALL SURFACES SHALL MEET THE FOLLOWING REQUIREMENTS:
   A. DO NOT DAMAGE EXISTING EMBEDDED REINFORCEMENT BARS
   B. LOCATE EXISTING REINFORCEMENT BARS WITH A PACHOMETER PRIOR TO INSTALLING FASTENERS TO AVOID DAMAGING EXISTING REINFORCEMENT BARS.
   C. VERIFY WITH STRUCTURAL FOR FASTENER TYPE, LOCATION AND DETAILS.

15. FINAL LOCATIONS OF ALL MECHANICAL AND ELECTRICAL EQUIPMENT, PANEL BOARDS, HEATERS, FIXTURES, FLUES, VENTS, OUTLETS, ECT., SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.

16. CONTRACTOR SHALL INFORM THE ENGINEER WHEN MECHANICAL, PLUMBING AND ELECTRICAL ARE READY FOR INSPECTION FOR EACH CONSTRUCTION PHASE BEFORE CLOSING CEILING.

17. UPON COMPLETION OF EACH CONSTRUCTION PHASE, COMPLETELY BALANCE HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. PROVIDE WRITTEN BALANCING REPORTS TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE.

18. PROJECT AREA SHALL BE THOROUGHLY CLEANED AND MADE READY FOR OCCUPANCY AT END OF EACH CONSTRUCTION PHASE.

19. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY UNKNOWN, CONCEALED, OR UNABATED ASBESTOS ENCOUNTERED DURING EACH DEMOLITION AND CONSTRUCTION PHASE. STOP WORK UNTIL INSTRUCTION IS GIVEN BY EBMUD.

20. NOTHING IN THE DRAWINGS SHALL BE INTERPRETED AS PERMITTING VIOLATION OF APPLICABLE EBMUD DIRECTIVES AND CODES GOVERNING CONSTRUCTION AND. WHERE CONFLICT OCCURS, EBMUD DIRECTIVES SHALL GOVERN, EXCEPT WHERE SUPERIOR CONSTRUCTION WORK IS SPECIFIED OR INDICATED. SUCH CONFLICTS SHALL BE BROUGHT TO EBMUD'S ATTENTION FOR CLARIFICATION, PRIOR TO ANY DEMOLITION AND CONSTRUCTION WORK.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND COORDINATING ALL PENETRATIONS THROUGH NEW AND EXISTING PRESTRESSED PRECAST CONCRETE PLANKS AND GRADE BEAMS WITH THE STRUCTURAL, MECHANICAL, PLUMBING AND ARCHITECTURAL CONSTRUCTION DOCUMENTS.

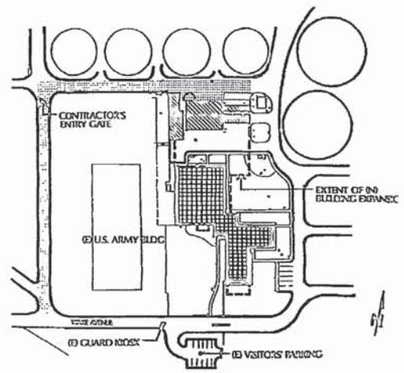
   X-RAYING OF EXISTING PRESTRESSED PRECAST CONCRETE IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE INCLUDED IN BID.

22. ALL MATERIALS AND EQUIPMENTS SHALL BE NEW AND UNUSED, UNLESS OTHERWISE NOTED AND OF HIGH QUALITY IN EVERY RESPECT.

INDEX OF DRAWINGS

LOCATION MAP

ACCESS MAP



- CONTRACTOR'S ACCESS ROAD
- (E) EBMUD ADMINISTRATION & LAB BUILDING (2020 WAKE AVENUE, OAKLAND)
- (E) EBMUD OFFICE TRAILERS TO BE REMOVED, U.O.N.

ED2 International

PLANNING
ARCHITECTURE
URBAN DESIGN
INTERIORS

1650 PACIFIC AVENUE
SAN FRANCISCO
CALIFORNIA 94109 2569
415 474 1400

Architect Reg. No.

LAB EXPANSION PROJECT SD-185

EBMUD

EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

EBMUD PROJECT NO.
R.P.E. NO. C 20278

EBMUD PROJECT NO.
R.P.E. NO. C 20278

EBMUD MGR. OF WASTEWATER
R.P.E. NO. C 20276

Issuances and Revisions

No.	Date	Description
1	1-15-96	ISSUED FOR CONSTRUCTION ADDENDUM NOS.1,2,3
	1-16-96	AS NOV 1994 AS BUILT MOD.

Date 7/29/91

Sheet Title
DRAWING INDEX, GENERAL NOTES, LEGEND, SYMBOLS, LOCATION & ACCESS MAPS

Scale: 3" = 1'-0", U.O.N.

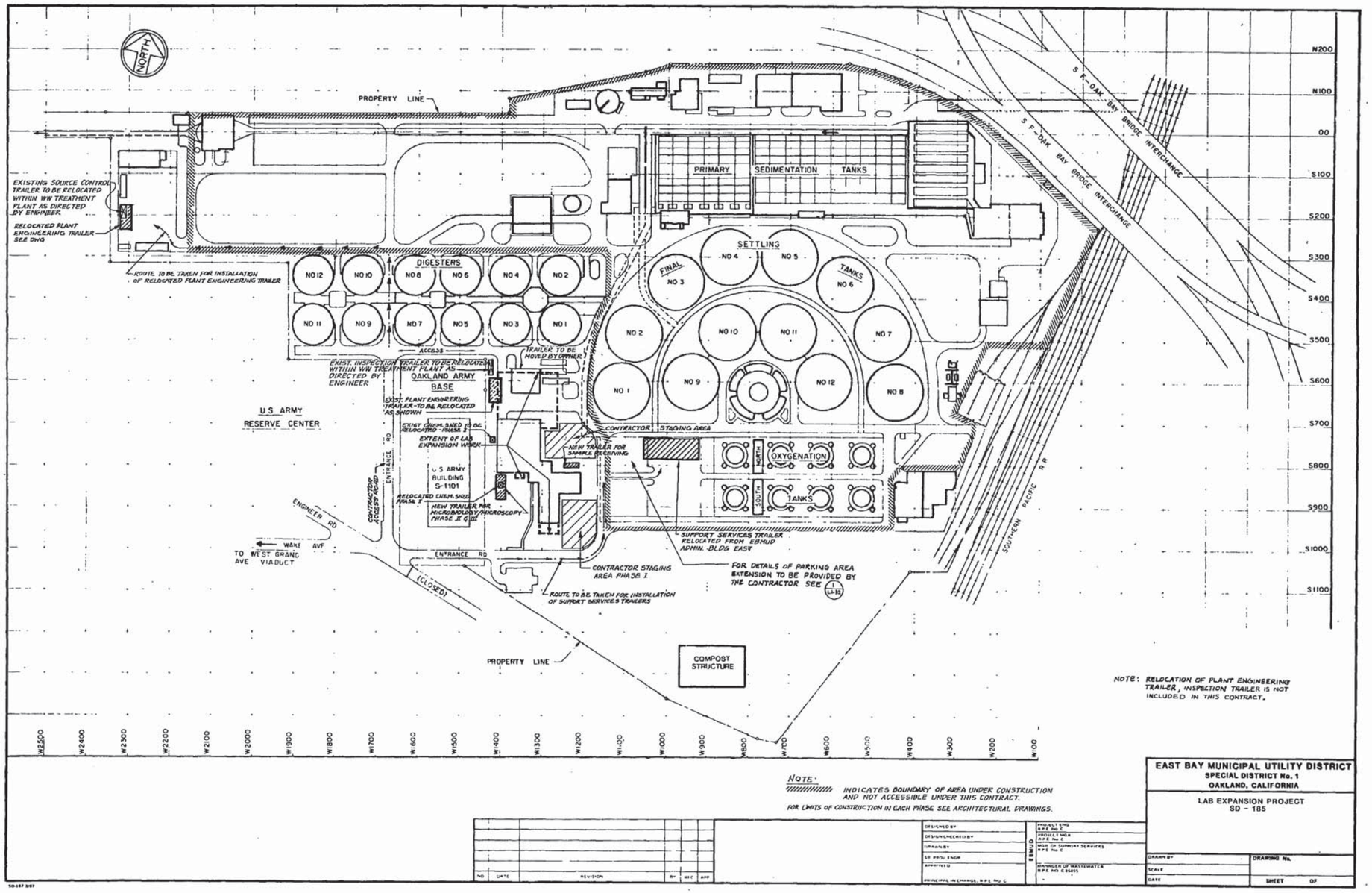
Project No. C092

T1.2 | 0

Sheet No. 2/178 | Revision

NOTE: IF THIS SHEET IS NOT 30"x42" IT IS A REDUCED PRINT

1/16" 1/8" 1/4" 1/2" 3/4" 1" 1 1/2" 3"



NOTE: RELOCATION OF PLANT ENGINEERING TRAILER, INSPECTION TRAILER IS NOT INCLUDED IN THIS CONTRACT.

NOTE:
////////// INDICATES BOUNDARY OF AREA UNDER CONSTRUCTION AND NOT ACCESSIBLE UNDER THIS CONTRACT.
FOR LIMITS OF CONSTRUCTION IN EACH PHASE SEE ARCHITECTURAL DRAWINGS.

NO	DATE	REVISION	BY	CHK	APP

DESIGNED BY
DESIGN CHECKED BY
DRAWN BY
SR PROJ ENGR
APPROVED
PRINCIPAL IN CHARGE, R.P.E. No. C

EBMUD: PROJECT ENG. R.P.E. NO. C 39959; PROJECT MGR. R.P.E. NO. C 31966; MGR. OF SUPPORT SERVICES R.P.E. No. C 33311; MANAGER OF WASTEWATER R.P.E. NO. C 39976

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

LAB EXPANSION PROJECT
SD - 185

DRAWN BY
SCALE
DATE
DRAWING No.
SHEET OF

THIS DRAWING IS MADE AVAILABLE FOR THE CONTRACTOR'S INFORMATION ONLY. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR ITS ACCURACY. THE CONTRACTOR SHALL VERIFY ALL UTILITIES AND DIMENSIONS IN THE FIELD.

USER: RW
DATE: 5-22-95
FILE: /usr2/eby/sd185/c12.dgn

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Architect Reg No.

EBMUD

LAB EXPANSION PROJECT SD-185

EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

REGISTERED PROFESSIONAL ENGINEER 12/31/92

Issuances and Revisions		
No.	Date	Description
1	1/29/92	ISSUE FOR CONSTRUCTION 5
	5-22-95	AS NOV 29 AUG 1994 AS BUILT REP. PYL

Date 7/29/91

Sheet Title

SITE MAP

Project No. 9002

C1.2 | 0

Sheet No. 4/18 | Revision

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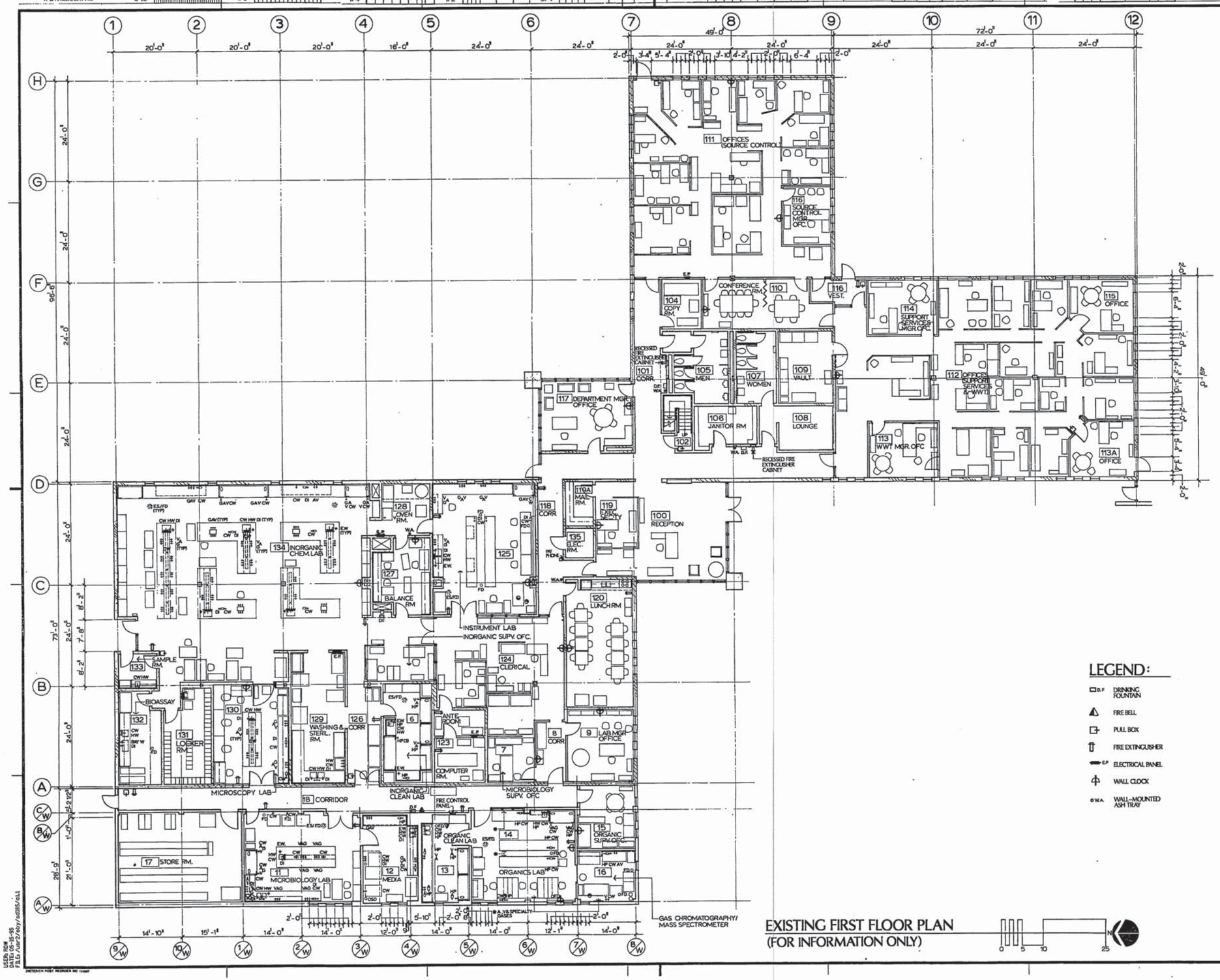

LEGEND:

- D.F DRINKING FOUNTAIN
- FIRE BELL
- PULL BOX
- FIRE EXTINGUISHER
- E.P ELECTRICAL PANEL
- WALL CLOCK
- W.A. WALL-MOUNTED ASH TRAY

EXISTING FIRST FLOOR PLAN
(FOR INFORMATION ONLY)

0 5 10 25

USER: RDW
DATE: 05-15-95
FILES: /usr2/eby/sd185/a11

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LAB EXPANSION PROJECT SD-185

EAST BAY MUNICIPAL UTILITY DISTRICT
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EBMUD PROJECT MGR.
R.P.E. NO. C 31999

EBMUD MGR. OF SUPPORT SERVICES
R.P.E. NO. C 33317

EBMUD MGR. OF WASTEWATER
R.P.E. NO. C 30976

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Issuances and Revisions

No.	Date	Description
1	1-5-96	ISSUED FOR CONSTRUCTION
	9-15-95	1994 AS BUILT MAP PTL

Date 7/29/91

Sheet Title
EXISTING
FIRST FLOOR PLAN

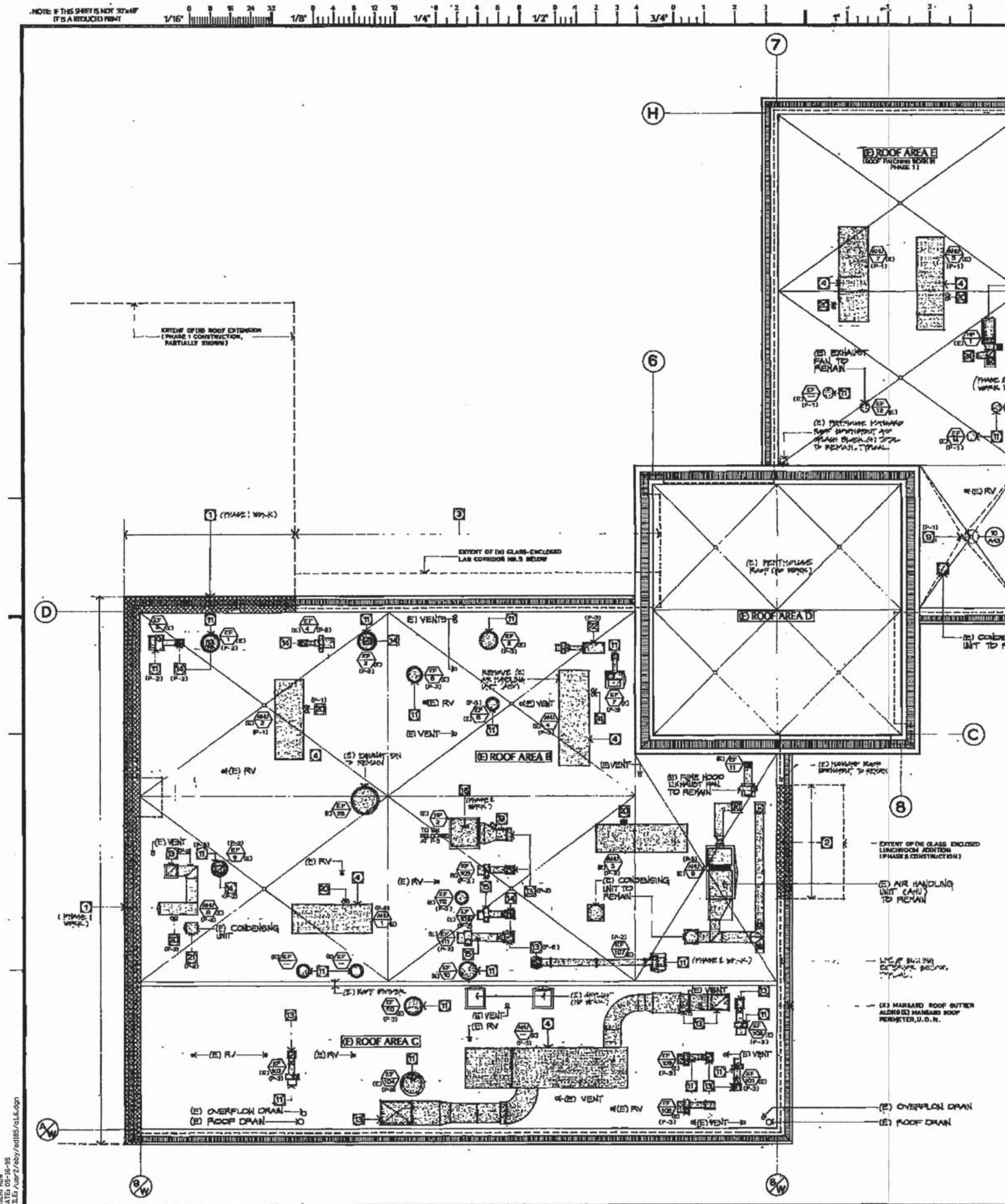
SCALE 1/8"=1'-0"

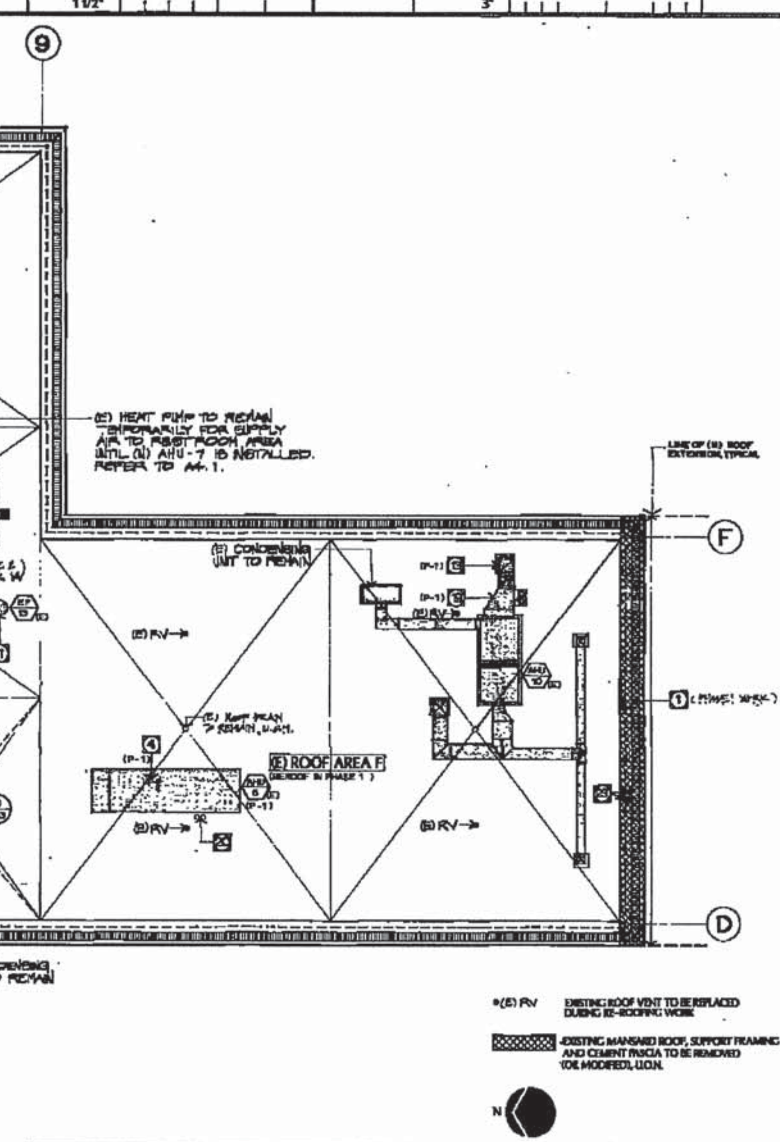
Project No. 8901

A1.1 | 0

Sheet No. 13/178 | Revision

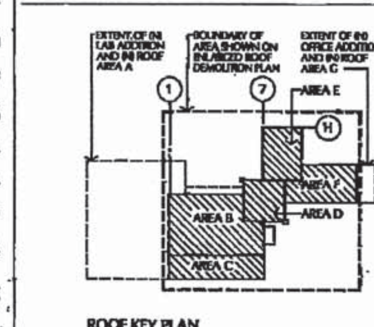
OK 5/21/96





ROOF DEMOLITION, PATCHING AND ALTERATION NOTES:

1. REMOVE (E) MANSARD ROOF AND (E) SUPPORT FRAMING. PATCH (E) BRICK PARAPET AND REPOINT JOINTS. PREPARE (E) PARAPET TO RECEIVE (N) ROOF AND (N) ROOF EXPANSION JOINT.
2. (E) MANSARD ROOF, SOFFIT AND (E) SUPPORT FRAMING BELOW TO BE MODIFIED FOR INSTALLATION OF (N) GLASS ENCLOSED LUNCH ROOM ADDITION.
3. MODIFY (E) MANSARD ROOF, SOFFIT AND (E) SUPPORT FRAMING BELOW FOR INSTALLATION OF (N) GLASS ENCLOSED LAB CORRIDOR #5.
4. REMOVE (E) AIR HANDLING UNIT, DUCT AND SUPPORT PAD. REPAIR AND PATCH (E) ROOF AND (E) DECK. SEE 15/A4.3.
5. PROVIDE (N) OPENINGS THROUGH (E) ROOF FOR (N) ELECTRICAL CONDUITS AND OTHER UTILITIES SERVICING (N) MECHANICAL UNITS.
6. PREPARE AND PROVIDE (N) MECHANICAL UNIT RAISED PLATFORM FOR (N) ROOFTOP UNITS. MODIFY, PATCH AND REPAIR (E) ROOF AND DECK. REFER TO STRUCTURAL FOR (N) SUPPORTING MEMBERS, U.O.
7. PREPARE AND PROVIDE (N) RAISED CURB FOR (N) DUCT PENETRATION THRU (E) ROOF. MODIFY, REPAIR AND PATCH ROOF AND DECK. REFER TO STRUCTURAL FOR (N) SUPPORTING MEMBERS, U.O.
8. PREPARE AND PROVIDE (N) DUCT SUPPORT. MODIFY, PATCH AND REPAIR (E) ROOF, FLASHING AND DECK. REFER TO STRUCTURAL FOR (N) SUPPORTING MEMBERS, U.O.
9. RELOCATE (E) ROOF DRAINS TO ACCOMMODATE (N) AHU 6 UNIT. MODIFY, PATCH AND REPAIR (E) ROOF DECK, FLASHING AND DRAIN LINE. REFER TO PLUMBING DEMOLITION PLAN AND NOTES.
10. MODIFY, PATCH AND REPAIR (E) DUCT FOR (N) EXTENSION. REFER TO MECHANICAL.
11. REMOVE (E) EXHAUST FAN AND (E) CURB. REPAIR AND PATCH (E) ROOF, FLASHING AND DECK. SEAL PENETRATIONS THRU (E) ROOF AND DECK.
12. REMOVE (E) HEAT PUMP. REPAIR AND PATCH ROOF AND DECK. SEAL PENETRATIONS.
13. REMOVE (E) DUCT AND (E) RAISED CURB. REPAIR, PATCH AND SEAL (E) PENETRATION THRU ROOF AND DECK.
14. RETAIN (E) RAISED CURB FOR (N) DUCT. REPAIR AND PATCH (E) RAISED CURB, ROOF AND FLASHING.
15. REMOVE (E) FUME HOOD EXHAUST FAN UNIT. REPAIR AND PATCH (E) ROOF, FLASHING AND DECK. SEAL ALL PENETRATIONS THRU (E) ROOF AND DECK, TYP.
16. RELOCATE (E) HEAT PUMP. REMOVE (E) PAD. REPAIR AND PATCH (E) ROOF AND DECK. SEAL ALL PENETRATIONS, TYP. SEE A4.1 FOR (N) LOCATION.
17. (N) LOCATION OF (E) HEAT PUMP. PREPARE AND PROVIDE PAD. REFER TO MECHANICAL.
18. PROVIDE AND INSTALL (N) DOWNSPOUT EXTENSION. RELOCATE (E) DOWNSPOUT AS SHOWN. PATCH AND REPAIR (E) GUTTER, (E) MANSARD ROOF SOFFIT AND (E) WALL TO MATCH (E).
19. DISCONNECT (E) DUCT FROM (E) UNIT. REFER TO MECHANICAL.
20. REMOVE (E) CONDUITS, PIPES AND PENETRATIONS. REPAIR AND PATCH (E) ROOF AND (E) DECK.
21. REMOVE (E) CONDENSING UNIT AND (E) PAD. REPAIR AND PATCH (E) ROOF AND (E) DECK.
22. REMOVE (E) ROOF TOP MECHANICAL UNIT AND (E) PAD. REPAIR AND PATCH (E) ROOF AND (E) DECK.
23. RELOCATE PARAPET MOUNTED (E) SURVEILLANCE CAMERA AND (E) INFRARED SENSOR. COORDINATE RELOCATION WITH ENGINEER. REFER TO ELECTRICAL.
24. CAP (E) RETURN AIR DUCT SEE MECHANICAL
25. WHEN MAKING THE CONNECTION BETWEEN NEW AND EXISTING ROOF, ALL LAB SPACE IN USE SHALL BE KEPT WATERPROOF.



ROOF KEY PLAN

REFER TO A4.1 AND A4.2 FOR ADDITIONAL INFORMATION

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Architect Reg. No.

EBMUD LAB EXPANSION PROJECT SD-155

EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

EBMUD PROJECT ENGI.
EBMUD PROJECT MGR.
EBMUD MGR. OF SUPPORT SERVICES
EBMUD MGR. OF WASTEWATER

Issuances and Revisions

No.	Date	Description
1	1-25-94	ISSUED FOR CONSTRUCTION ADDENDUM 1
	9-22-93	PHASE I AS-BUILTS
	05-16-95	26 AUG 1994 AS BUILT

Date 7/29/93

Sheet Title
ROOF DEMOLITION PLAN

SCALE 1/8"=1'-0"

Project No. 9002

A1.6 — Revision 0

Sheet No. 13/178

OK 11/13/97

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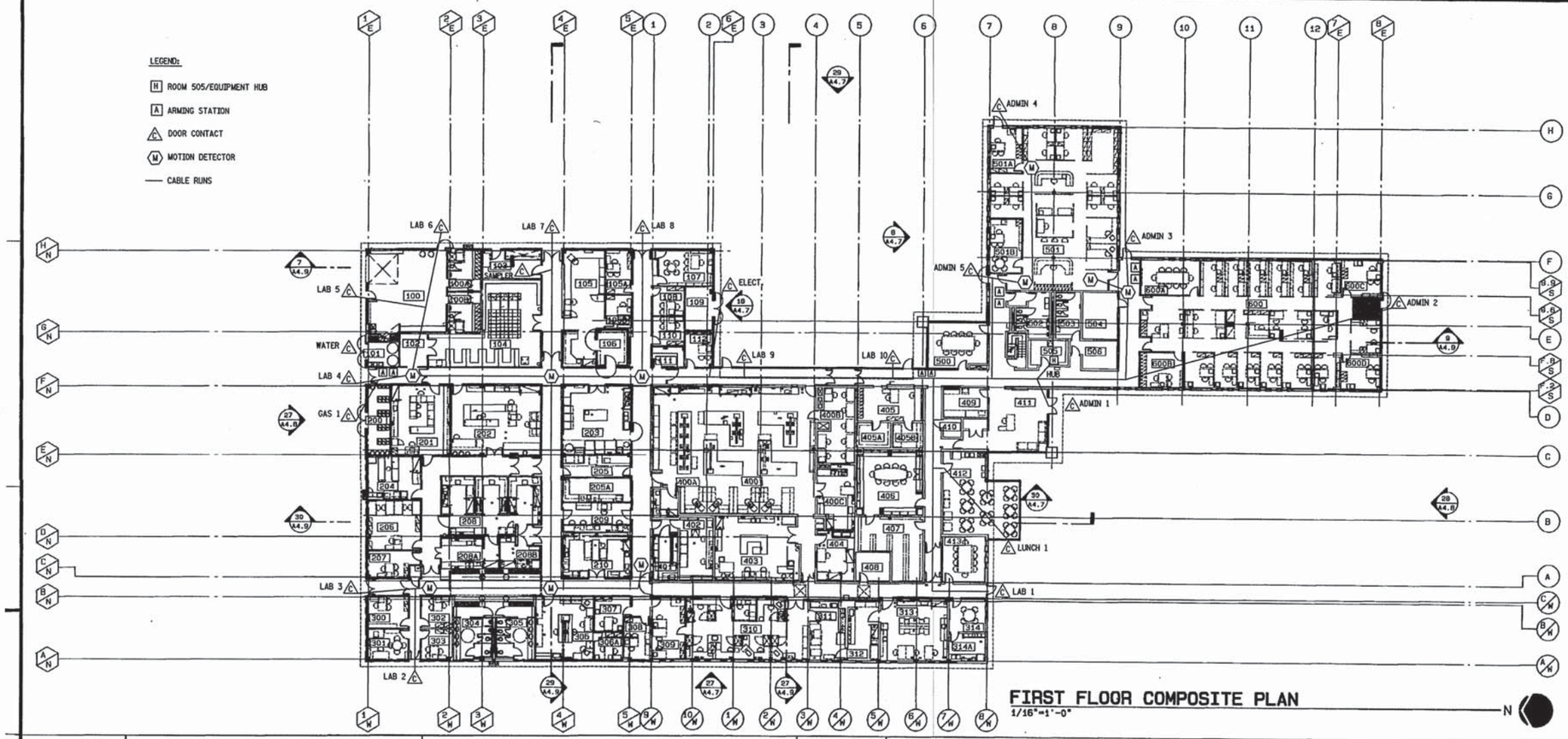

FIRST FLOOR COMPOSITE PLAN

1/16"=1'-0"

N

ROOM NO.	ROOM NAME	NOTES
100	FIELD SERVICES	(N) NORTH WING LAB ADDITION
100A	MEN'S LOCKER/RESTROOM	" "
100B	WOMEN'S LOCKER/RESTROOM	" "
101	D.I.	" "
102	SHIPPING/RECEIVING AREA	" "
103	SAMPLE NIGHT DROP	" "
104	STORE ROOM	" "
105	SAMPLE RECEIVING	" "
105A	INORG. SUPERVISOR	" "
105B	MICRO. ASSISTANT	" "
106	COLD ROOM	" "
107	LAB MANAGER	" "
108	INORG. ASST. SUPERVISOR	" "
109	ELECTRICAL ROOM	" "
110	INORG. ASST. SUPERVISOR	" "
111	INSTRUMENT REPAIR SHOP	" "
112	SHARED OFFICE	" "
200	GAS CYLINDER STORAGE ROOM	" "
201	GENERAL CHEMISTRY	" "
202	L.C./M.S & G.C./M.S.	" "
203	GLASS WASH	" "
204	V.O.A.	" "
205	OVEN ROOM	" "
205A	BALANCE	" "
206	ORGANIC OPEN OFFICE	" "
207	ORGANIC RES. OFFICE	" "
208	SAMPLE CON. & CLEAN	" "
208A	CLSA	" "
208B	HAZARDOUS MATERIALS	" "
209	SPECTROSCOPY	" "
210	LIQUID INSTRUMENT	" "
300	SUPERVISOR'S OFFICE	" "
301	SUPERVISOR'S OFFICE	" "
302	SUPERVISOR'S OFFICE	" "
303	SUPERVISOR'S OFFICE	" "
304	MEN'S RESTROOM	" "
305	WOMEN'S RESTROOM	" "
306	TOXICOLOLOGY	" "
306A	AQUATIC TOXICOLOGY	" "
307	SUPERVISOR'S OFFICE	" "

ROOM NO.	ROOM NAME	NOTES
308	MICROBIOLOGY SUPERVISOR'S OFFICE	
309	MICROBIOLOGY OPEN OFFICE	PART OF (E) STORE ROOM
310	MICROBIOLOGY	PART OF (E) STORE ROOM
311	MEDIA KITCHEN	
312	CLEAN ROOM	
313	MICROSCOPY	(E) ORGANICS LAB
314	E.M. (FLAVOR PROFILE)	(E) ORGANIC SUPERVISOR'S OFFICE
314A	E.M. (FLAVOR PROFILE)	(E) GAS CHROMATOGRAPHY / MASS SPECTROMETER
400	INORG. CHEM. LAB.	
400A	RADIOLOGICAL LAB	(E) SAMPLE ROOM
400B	INORG. OPEN OFFICE	(E) OVEN AND BALANCE ROOMS
400C	INSTRUMENT LAB	PART OF (E) INORG. SUPV. OFFICE AND (E) BALANCE RM.
401	BIOASSAY (ANTE ROOM)	
402	BIOASSAY (MAIN ROOM)	(E) LOCKER ROOM
403	ICP ICP/MS	(E) MICROSCOPY LAB & (E) WASHING & STERILIZING ROOM
404	PREPARATION LAB	(E) INORGANIC CLEAN LAB
405	CLERICAL LAB	PART OF (E) INSTRUMENT LAB
405A	STORAGE (CLERICAL)	PART OF (E) INSTRUMENT LAB
405B	COPY (CLERICAL)	PART OF (E) INSTRUMENT LAB
406	LIBRARY	(E) CLERICAL AND LAB CORRIDOR
407	ARCHIVES/STORAGE	(E) COMPUTER ANTE RM., MICROBIOLOGY SUPV. AND CLERICAL
408	COMPUTER ROOM	
409	MAIL/FAX	(E) MAIL ROOM AND EXECUTIVE SECRETARY STATION
410	ELECTRICAL ROOM	
411	RECEPTION/WAITING	
411A	STORAGE (AT RECEPTION/WAITING AREA)	NEW
412	LUNCH ROOM	(N) ADDITION ADDED
413	CONFERENCE ROOM (COMMON)	(E) LAB MANAGER'S OFFICE
500	CONFERENCE ROOM (EAST OFFICE WING)	(E) WWT MANAGER'S OFFICE
501	OPEN OFFICE (EAST WING)	PART OF (E) SOURCE CONTROL OFFICES
501A	FIELD SERVICES SUPERVISOR	PART OF (E) SOURCE CONTROL OFFICES
501B	WWT. MANAGER	PART OF (E) SOURCE CONTROL OFFICES
502	MEN'S RESTROOM	
503	WOMEN'S RESTROOM	
504	VAULT	
505	JANITOR	
506	LOUNGE	DOOR MODIFICATIONS FOR HANDICAP ACCESS
600	FIELD OFFICES	(E) SUPPORT SERVICES & WWT OFFICES
600A	CONFERENCE ROOM (SOUTH OFFICE WING)	(E) SUPPORT SERVICES MGR. OFFICE
600B	MCP SUPERVISOR	(E) WWT MANAGER'S OFFICE
600C	SUPV. CONSTRUCTION INSPECTION	(N) SOUTH WING OFFICE ADDITION
600D	PE, MCP.	(N) SOUTH WING OFFICE ADDITION

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Architect — Reg. No. 18018

EBMUD

LAB EXPANSION PROJECT
SD-185

EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

EBMUD PROJECT ENG. R.P.E. NO. C 39959

EBMUD PROJECT MGR. R.P.E. NO. C 31966

EBMUD MGR. OF SUPPORT SERVICES R.P.E. NO. C 33317

EBMUD MGR. OF WASTEWATER R.P.E. NO. C 30976

Issuances and Revisions

No.	Date	Description
1	1-15-92	ISSUED FOR CONSTRUCTION
	7-29-95	AS NOTED ON AUG 1994 AS BUILT DRWG. PYL

Date 7/29/91

Sheet Title
FIRST FLOOR COMPOSITE PLAN

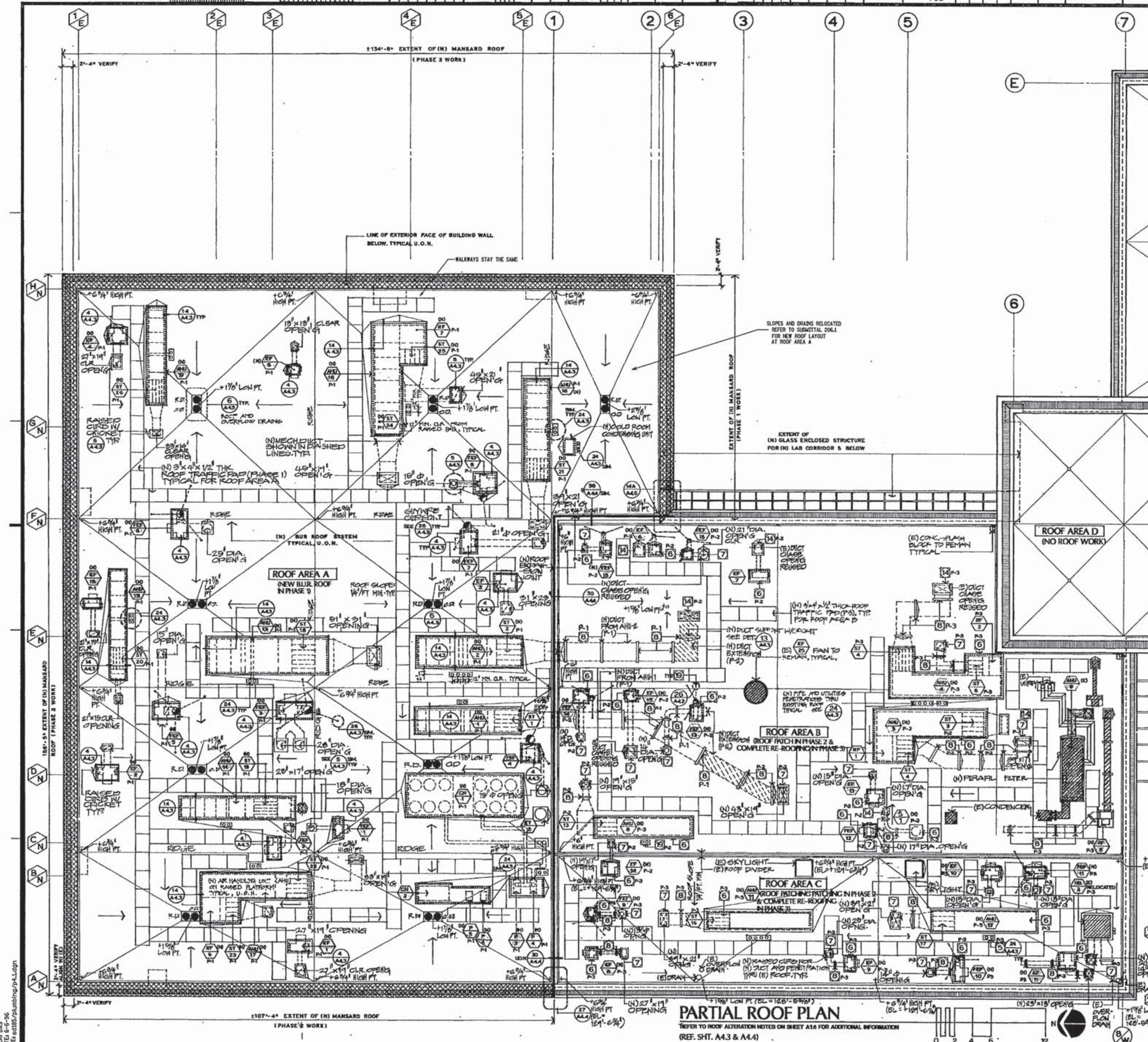
Scale: 1/16" = 1'-0"

Project No. 9002

A2.1 — 0

Sheet No. 19/178 — Revision

SK 11/14/97 RMG



ROOF NOTES

1. THE CONTRACTOR IS CAUTIONED THAT THIS PROJECT INVOLVES PHASING OF ROOF WORK, AS WELL AS, DEMOLITION, ALTERATION, PATCHING AND RE-ROOFING OF EXISTING BUILT-UP BITUMINOUS ROOF (B.U.R.) AND EXISTING MANSARD METAL ROOF AS NOTED IN THE CONSTRUCTION DOCUMENTS.
2. WORK WHICH IS REQUIRED TO BE PERFORMED TO PROVIDE A COMPLETELY WATERPROOF AND OPERABLE ROOF INSTALLATION WITHIN THIS SCOPE OF WORK, BUT WHICH IS NOT SPECIFICALLY INCLUDED IN THE DRAWINGS, SHALL BE PERFORMED AS PART OF THE CONTRACT AND INCLUDED IN THE BID.
3. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING, LOCATING AND VERIFYING THE SIZES OF ALL NEW PENETRATIONS THROUGH EXISTING AND NEW ROOFS FOR DUCT, PIPING AND OTHER UTILITY RUNS WITH THE STRUCTURAL, MECHANICAL, ELECTRICAL PLUMBING AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL ADJUSTMENTS IN DIMENSIONS, OPENING SIZES, LOCATIONS, STRUCTURAL SUPPORTS, ETC. OF ALL SUBSTITUTE ROOF-MOUNTED MECHANICAL EQUIPMENT, SYSTEM AND ANY OTHER WORK WHICH AFFECT THE PROPER INSTALLATION AND OPERATION OF SUBSTITUTED ITEMS.
5. MINIMUM THICKNESS OF ROOF INSULATION BOARD AT ROOF DRAINS ARE MEASURED FROM TOP OF CONCRETE FILLED METAL DECKING. TOP OF CONCRETE FILLED METAL DECKING IS +0". (EL = 127'-10" VERIFY), TYP. (ROOF AREA C TOP OF CONC. DECK VARIES).
6. ALL ARROWS ON ROOFS ARE INDICATING THE DIRECT OF SLOPE OF ROOF OR CRICKET FROM HIGH POINT TO THE LOW POINT.
7. ROOF INSULATION BOARD SYSTEM SHALL PROVIDE A MINIMUM THERMAL RESISTANCE OF R15.7.
8. REFER TO ROOF ALTERATION NOTES ON SHEET A1.6 FOR ADDITIONAL ROOFING WORK REQUIREMENTS. SEE ROOF PHASING NOTES ON SHEET A4.2.
9. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT ALL CONSTRUCTION TRADES FROM DAMAGING THE ROOFS DURING AND AFTER EACH CONSTRUCTION PHASES. PROTECT (E) ROOF-TOP MOUNTED EQUIPMENTS, UTILITY LINES AND DUCTS DURING EACH DEMOLITION AND CONSTRUCTION WORK PHASE. PROVIDE TEMPORARY PROTECTIVE TRAFFIC PAD ON ROOF UNTIL (N) PADS ARE INSTALLED.
10. STRUCTURAL REINFORCEMENT OF (E) ROOF STRUCTURAL MEMBERS SHALL BE COMPLETED PRIOR TO THE INSTALLATION OF (N) MECHANICAL EQUIPMENT AND PAD. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION AND SCHEDULING.
11. PROVIDE 18" MINIMUM CLEARANCE BETWEEN DRAINS, AND PIPES, AND 24" MINIMUM FROM WALLS, PARAPETS AND CURBS WHEREVER THEY OCCUR SO THAT PROPER FLASHING OF ALL PENETRATIONS CAN BE ACCOMPLISHED.
12. VERIFY THAT ALL REUSED (E) DUCT CHASE OPENINGS ARE ADEQUATE FOR (N) DUCTS. INFORM ENGINEER OF SPACE CONSTRAINT PRIOR TO COMMENCEMENT OF WORK.

(N) DUCT EXTENSION WORK IN P-2

P1 - PHASE 1 WORK

P2 - PHASE 2 WORK

P3 - PHASE 3 WORK

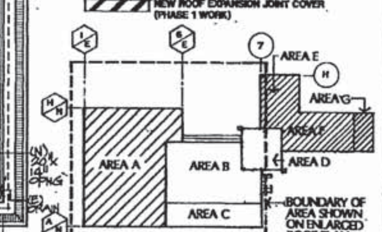
(N) RAISED PLATFORM FOR (N) MECHANICAL UNITS. PLATFORM SIZE AND CONFIGURATION VARY

EXISTING ROOFTOP MECHANICAL UNITS TO REMAIN

EXISTING ROOFTOP MECHANICAL UNITS RELOCATED

(N) PARAPET, MANSARD ROOF, FRAMING, CEM. PLASTER FASCIA AND SOFFIT, TYPICAL U.O.N. (N) MANSARD ROOF SHALL MATCH W/ (E) IN PROFILE, FINISH, COLOR, DIMENSIONS AND ELEVATIONS, U.O.N.

NEW ROOF EXPANSION JOINT COVER (PHASE 1 WORK)



ROOF PHASING & KEY PLAN
(REFER TO ROOF PHASING NOTES ON SHT. A4.2)

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EBMUD — LAB EXPANSION PROJECT SD-165

EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

EBMUD PROJECT ENG. R.P.E. NO. C 30959
EBMUD PROJECT MGR. R.P.E. NO. C 31968
EBMUD MGR. OF SUPPORT SERVICES R.P.E. NO. C 33317
EBMUD MGR. OF WASTEWATER R.P.E. NO. C 30976

Issuances and Revisions

No.	Date	Description
2	1-15-92	ISSUED FOR CONSTRUCTION
	9-28-93	PHASE I AS-BUILT
	11-24-93	26 AUG 94 AS-BUILT

Date 7/29/91

Sheet Title
PARTIAL ROOF PLAN & ROOF NOTES

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

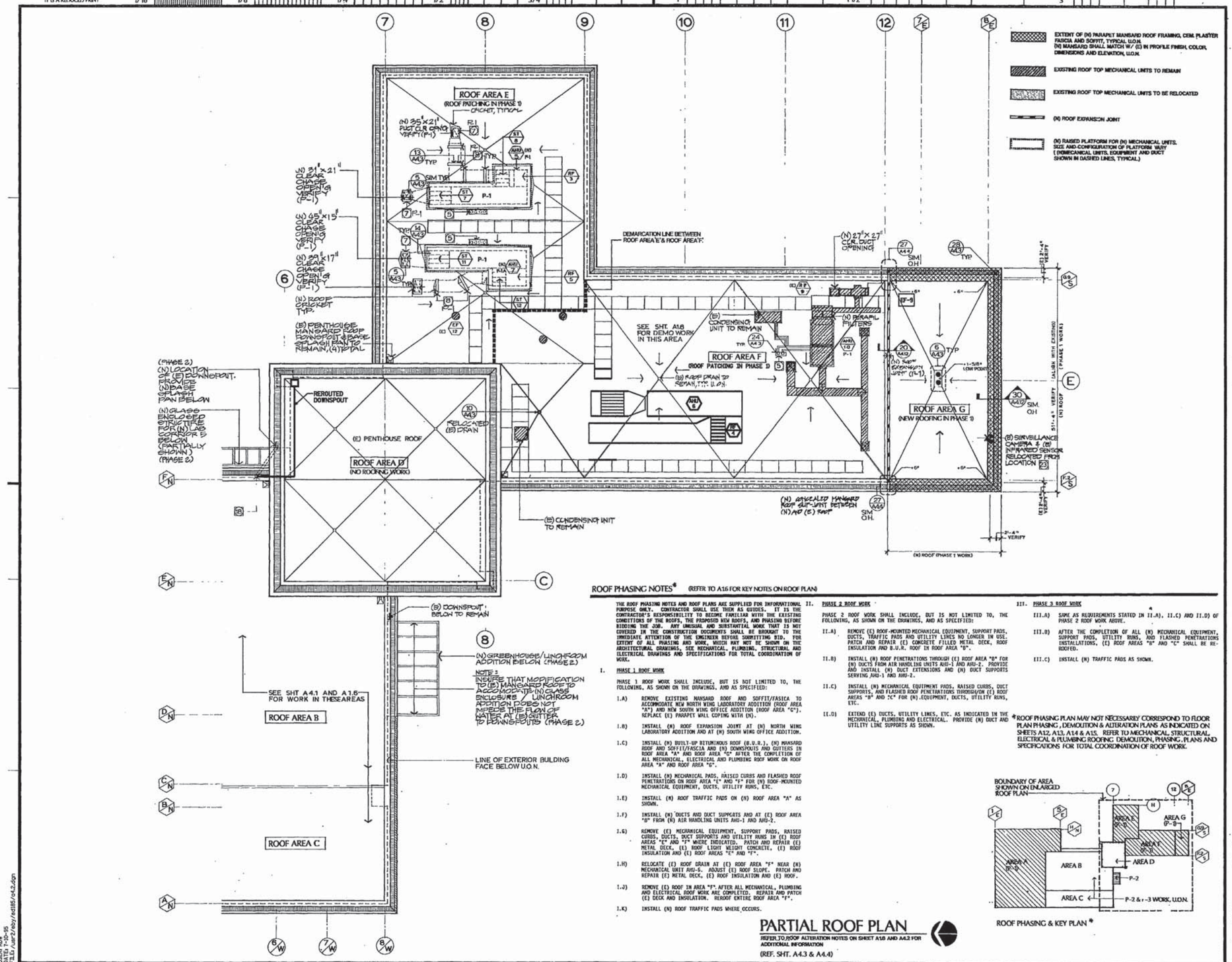
Project No. 9002

A4.1 — Revision 0

Sheet No. 34/178

OK 11/13/07

NOTE: IF THIS SHEET IS NOT 36"x40" IT IS A REDUCED PRINT



USER: ROM
LAST XREF: 10-9-95
FILES: /usr2/eby/ed185/a43.dgn

ROOF PHASING NOTES* (REFER TO A16 FOR KEY NOTES ON ROOF PLAN)

THE ROOF PHASING NOTES AND ROOF PLANS ARE SUPPLIED FOR INFORMATIONAL PURPOSE ONLY. CONTRACTOR SHALL USE THEM AS GUIDES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS OF THE ROOFS, THE PROPOSED NEW ROOFS, AND PHASING BEFORE BIDDING THE JOB. ANY UNUSUAL AND SUBSTANTIAL WORK THAT IS NOT COVERED IN THE CONSTRUCTION DOCUMENTS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER BEFORE SUBMITTING BID. FOR EXTENT OF ALL PHASING AND WORK, WHICH MAY NOT BE SHOWN ON THE ARCHITECTURAL DRAWINGS, SEE MECHANICAL, PLUMBING, STRUCTURAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR TOTAL COORDINATION OF WORK.

I. PHASE 1 ROOF WORK

PHASE 1 ROOF WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING, AS SHOWN ON THE DRAWINGS, AND AS SPECIFIED:

I.A) REMOVE EXISTING MANSARD ROOF AND SOFFIT/FASICA TO ACCOMMODATE NEW NORTH WING LABORATORY ADDITION (ROOF AREA "A") AND NEW SOUTH WING OFFICE ADDITION (ROOF AREA "C"). REPLACE (E) PARAPET WALL COPING WITH (N).

I.B) INSTALL (N) ROOF EXPANSION JOINT AT (N) NORTH WING LABORATORY ADDITION AND AT (N) SOUTH WING OFFICE ADDITION.

I.C) INSTALL (N) BUILT-UP BITUMINOUS ROOF (B.U.R.), (N) MANSARD ROOF AND SOFFIT/FASCIA AND (N) DOWNSPOUTS AND GUTTERS IN ROOF AREA "A" AND ROOF AREA "C" AFTER THE COMPLETION OF ALL MECHANICAL, ELECTRICAL AND PLUMBING ROOF WORK ON ROOF AREA "A" AND ROOF AREA "G".

I.D) INSTALL (N) MECHANICAL PADS, RAISED CURBS AND FLASHED ROOF PENETRATIONS ON ROOF AREA "E" AND "F" FOR (N) ROOF-MOUNTED MECHANICAL EQUIPMENT, DUCTS, UTILITY RUNS, ETC.

I.E) INSTALL (N) ROOF TRAFFIC PADS ON (N) ROOF AREA "A" AS SHOWN.

I.F) INSTALL (N) DUCTS AND DUCT SUPPORTS AND AT (E) ROOF AREA "B" FROM (N) AIR HANDLING UNITS AHU-1 AND AHU-2.

I.G) REMOVE (E) MECHANICAL EQUIPMENT, SUPPORT PADS, RAISED CURBS, DUCTS, DUCT SUPPORTS AND UTILITY RUNS IN (E) ROOF AREAS "E" AND "F" WHERE INDICATED. PATCH AND REPAIR (E) METAL DECK, (E) ROOF LIGHT WEIGHT CONCRETE, (E) ROOF INSULATION AND (E) ROOF AREAS "E" AND "F".

I.H) RELOCATE (E) ROOF DRAIN AT (E) ROOF AREA "F" NEAR (N) MECHANICAL UNIT AHU-6. ADJUST (E) ROOF SLOPE. PATCH AND REPAIR (E) METAL DECK, (E) ROOF INSULATION AND (E) ROOF.

I.J) REMOVE (E) ROOF IN AREA "F". AFTER ALL MECHANICAL, PLUMBING AND ELECTRICAL ROOF WORK ARE COMPLETED. REPAIR AND PATCH (E) DECK AND INSULATION. REROOF ENTIRE ROOF AREA "F".

I.K) INSTALL (N) ROOF TRAFFIC PADS WHERE OCCURS.

II. PHASE 2 ROOF WORK

PHASE 2 ROOF WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING, AS SHOWN ON THE DRAWINGS, AND AS SPECIFIED:

II.A) REMOVE (E) ROOF-MOUNTED MECHANICAL EQUIPMENT, SUPPORT PADS, DUCTS, TRAFFIC PADS AND UTILITY LINES NO LONGER IN USE. PATCH AND REPAIR (E) CONCRETE FILLED METAL DECK, ROOF INSULATION AND B.U.R. ROOF IN ROOF AREA "B".

II.B) INSTALL (N) ROOF PENETRATIONS THROUGH (E) ROOF AREA "B" FOR (N) DUCTS FROM AIR HANDLING UNITS AHU-1 AND AHU-2. PROVIDE AND INSTALL (N) DUCT EXTENSIONS AND (N) DUCT SUPPORTS SERVING AHU-1 AND AHU-2.

II.C) INSTALL (N) MECHANICAL EQUIPMENT PADS, RAISED CURBS, DUCT SUPPORTS, AND FLASHED ROOF PENETRATIONS THROUGH/ON (E) ROOF AREAS "B" AND "C" FOR (N) EQUIPMENT, DUCTS, UTILITY RUNS, ETC.

II.D) EXTEND (E) DUCTS, UTILITY LINES, ETC. AS INDICATED IN THE MECHANICAL, PLUMBING AND ELECTRICAL. PROVIDE (N) DUCT AND UTILITY LINE SUPPORTS AS SHOWN.

III. PHASE 3 ROOF WORK

III.A) SAME AS REQUIREMENTS STATED IN II.A), II.C) AND II.D) OF PHASE 2 ROOF WORK ABOVE.

III.B) AFTER THE COMPLETION OF ALL (N) MECHANICAL EQUIPMENT, SUPPORT PADS, UTILITY RUNS, AND FLASHED PENETRATIONS INSTALLATIONS, (E) ROOF AREAS "B" AND "C" SHALL BE RE-ROOFED.

III.C) INSTALL (N) TRAFFIC PADS AS SHOWN.

*ROOF PHASING PLAN MAY NOT NECESSARILY CORRESPOND TO FLOOR PLAN PHASING, DEMOLITION & ALTERATION PLANS AS INDICATED ON SHEETS A12, A13, A14 & A15. REFER TO MECHANICAL, STRUCTURAL, ELECTRICAL & PLUMBING ROOFING DEMOLITION, PHASING, PLANS AND SPECIFICATIONS FOR TOTAL COORDINATION OF ROOF WORK.

ROOF PHASING & KEY PLAN *

PARTIAL ROOF PLAN

REFER TO ROOF ALTERATION NOTES ON SHEET A1.8 AND A4.2 FOR ADDITIONAL INFORMATION

(REF. SHT. A4.3 & A4.4)

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LAB EXPANSION PROJECT SD-185

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EBMUD MGR. OF SUPPORT SERVICES R.P.E. NO. C 33317

EBMUD MGR. OF WASTEWATER R.P.E. NO. C 30978

Issuances and Revisions

No.	Date	Description
1	1-25-96	ISSUED FOR CONSTRUCTION
	9-28-93	PHASE I AS-BUILT
	7-10-95	ADDENDUM #1 10-10-1994 AS BUILT
		REV. PYL

Date 7/29/91

Sheet Title
PARTIAL ROOF PLAN & ROOF PHASING NOTES

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

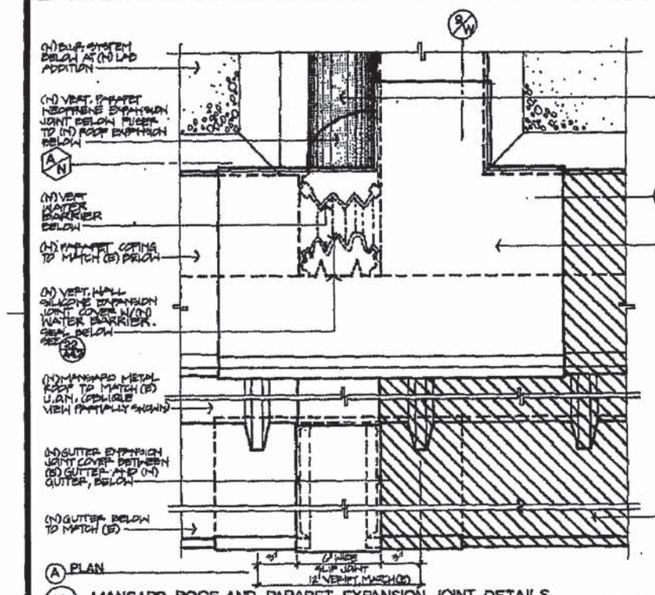
Project No. 9002

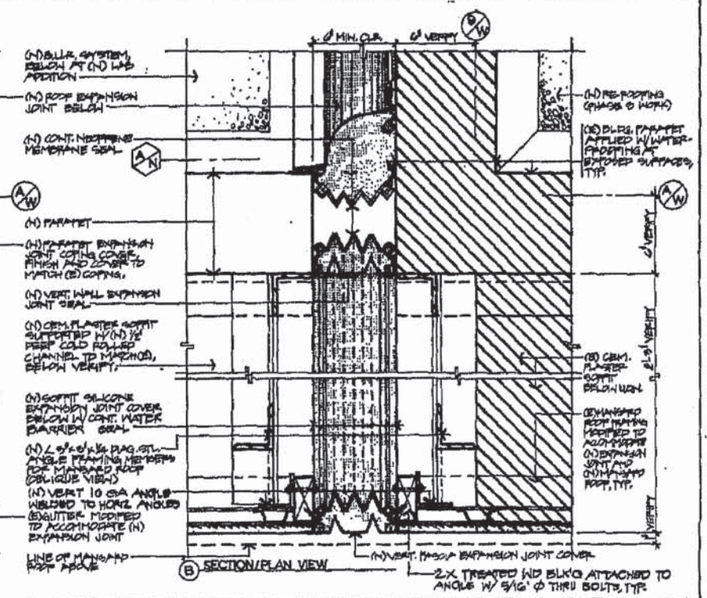
A4.2 | 0

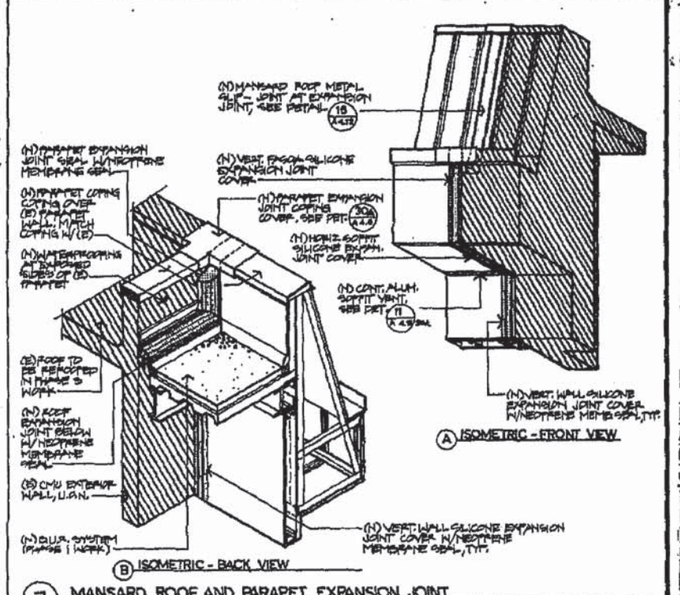
Sheet No. 35/175 | Revision

OK 11/13/97

NOTE: IF THIS SHEET IS NOT 30"x42" IT IS A REDUCED PRINT

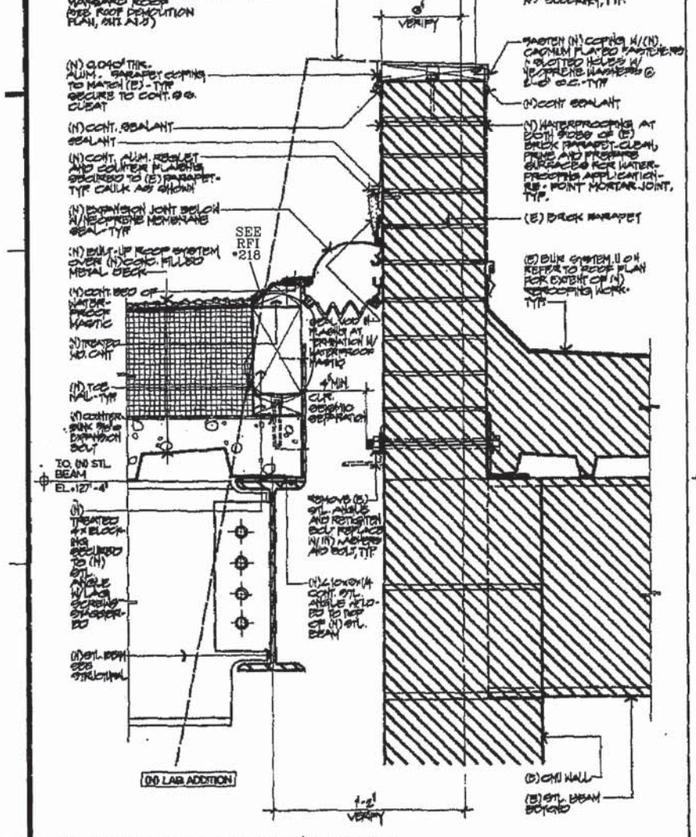




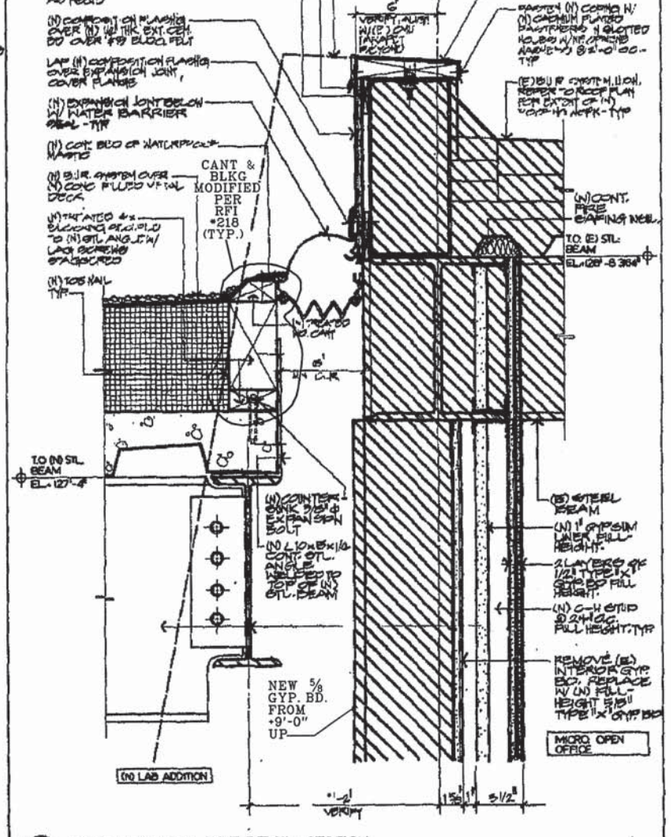


27 MANSARD ROOF AND PARAPET EXPANSION JOINT DETAILS — 3"=1'-0"

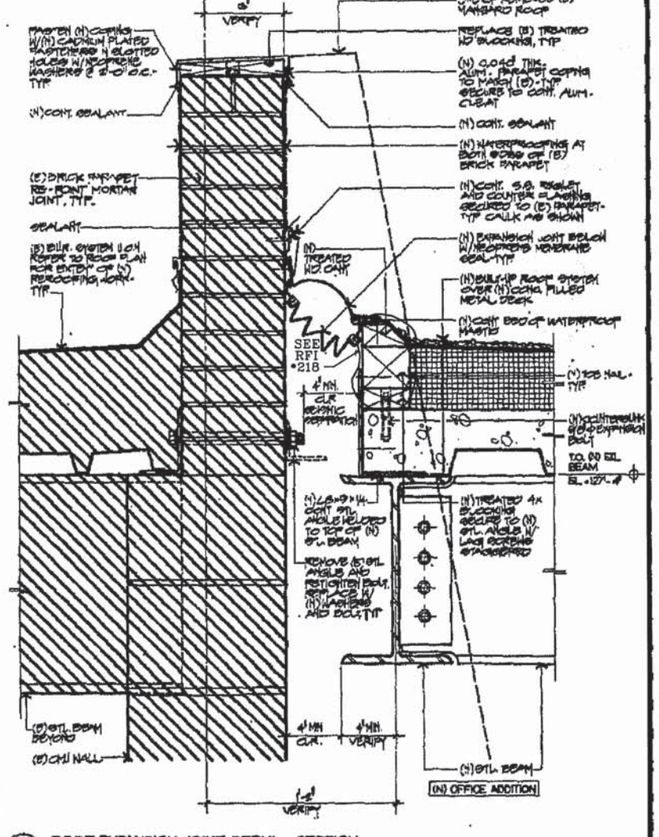
7 MANSARD ROOF AND PARAPET EXPANSION JOINT (REF. SHT A2.6) — NO SCALE



30 ROOF EXPANSION JOINT DETAIL - SECTION AT (N) LAB ADDITION (REF. SHT. 15/A4.11) — 3"=1'-0"



20 ROOF EXPANSION JOINT DETAIL - SECTION AT (N) LAB ADDITION (REF. SHT. 30/A4.9) — 3"=1'-0"



10 ROOF EXPANSION JOINT DETAIL - SECTION AT (N) OFFICE ADDITION (REF. SHT. 20/A4.12) — 3"=1'-0"

USER: rgp
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EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

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EBMUD MGR. OF SUPPORT SERVICES P.E. NO. C 22317
EBMUD MGR. OF WASTEWATER P.E. NO. C 20978

Issuances and Revisions

No.	Date	Description
1	1-13-94	ISSUED FOR CONSTRUCTION
	9-28-93	PHASE 1 AS-BUILT
	7-6-95	AS BUILT 1994 MFR. PYL

Date 7/29/91
Sheet Title
PARAPET AND MANSARD ROOF EXPANSION JOINT DETAILS (REF. SHT. A4.1 & A4.2)
SCALE: AS NOTED
Project No. 9002

A 4.4 — 0
Sheet No. 31/178 — Revision

OK 9/97 MW

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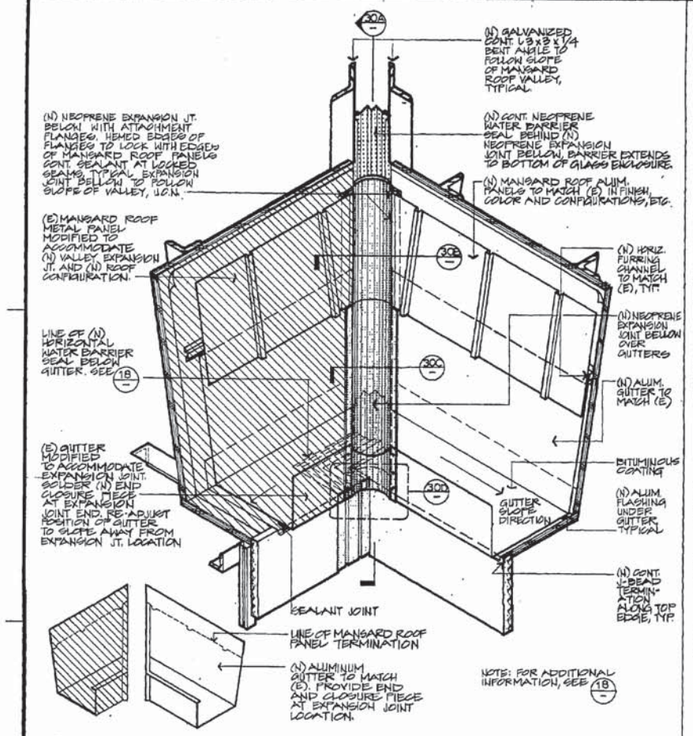
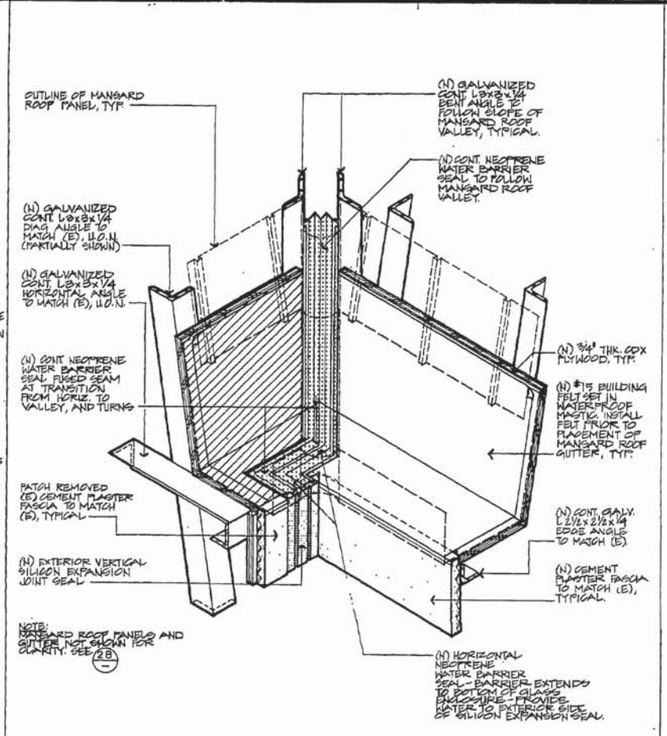
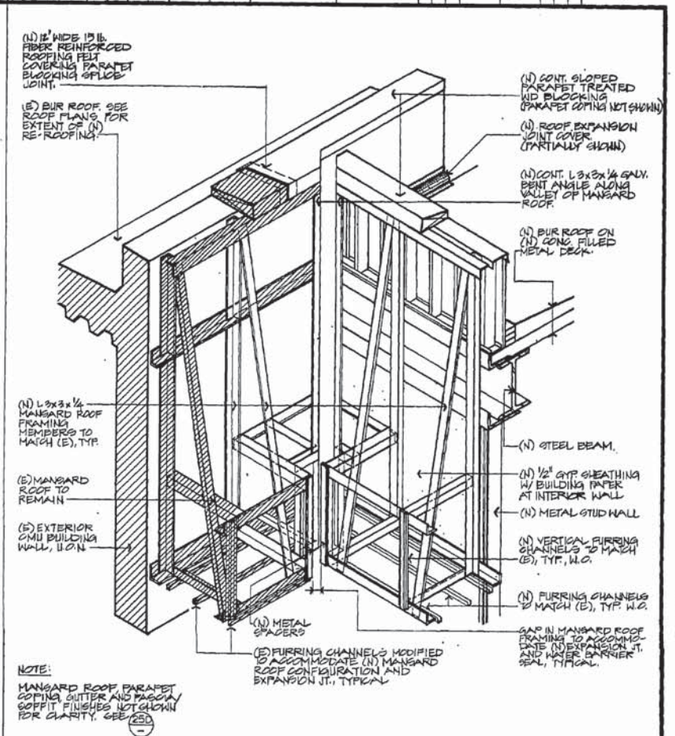


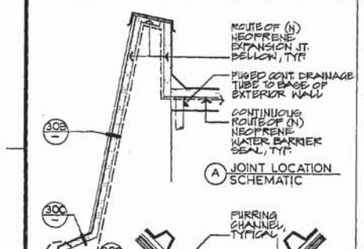
28 MANSARD ROOF DETAIL - ISOMETRIC
AT VALLEY AND GUTTER EXPANSION JOINTS — NO SCALE



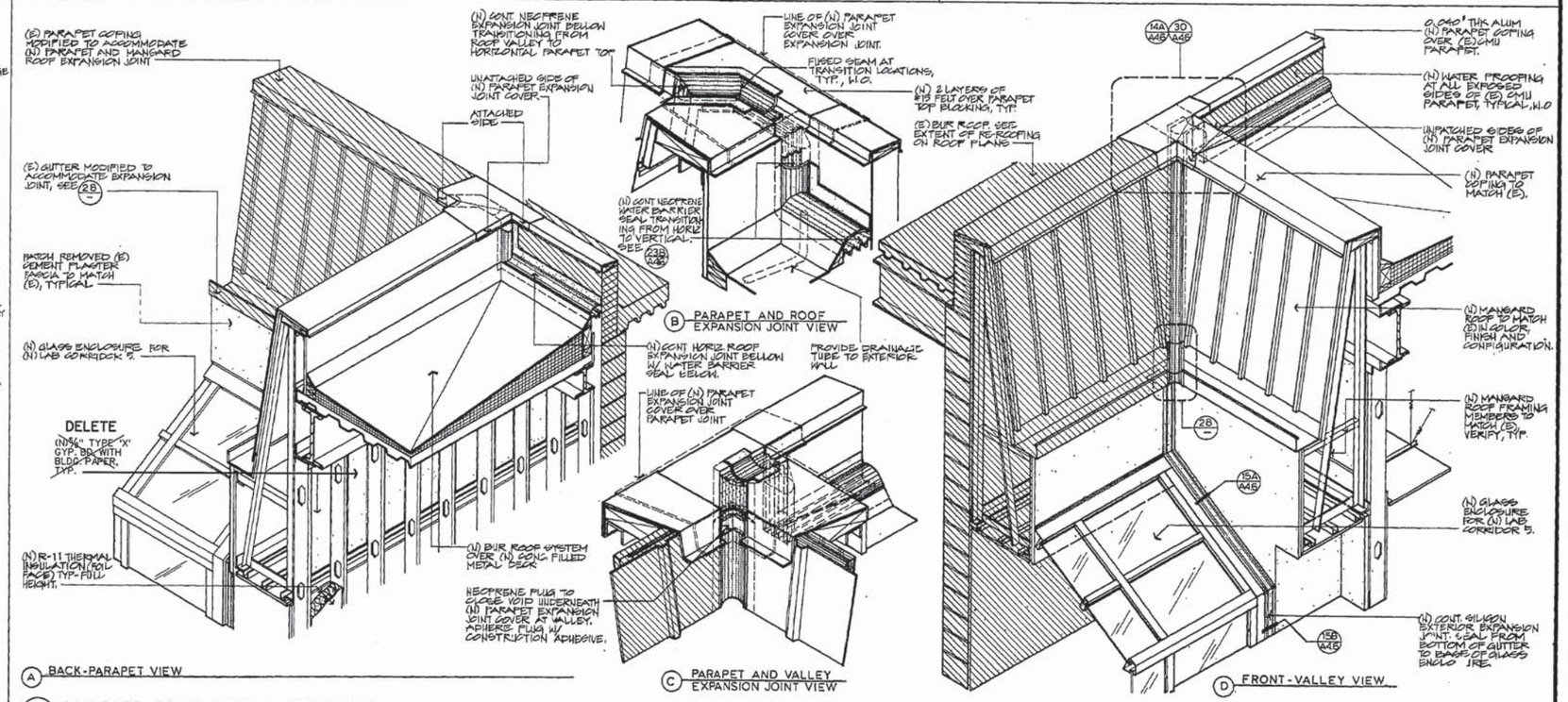
18 MANSARD ROOF DETAIL - ISOMETRIC (PARTIAL VIEW)
AT VALLEY EXPANSION JOINT — NO SCALE



8 MANSARD ROOF FRAMING DETAIL - ISOMETRIC (PARTIAL VIEW)
AT VALLEY EXPANSION JOINT — NO SCALE



30 EXPANSION JOINT DETAILS
NO SCALE



25 MANSARD ROOF DETAILS - ISOMETRIC
AT VALLEY AND PARAPET EXPANSION JOINTS (REF. SHT A4.1)
NO SCALE

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Issuances and Revisions

No.	Date	Description
2	1-15-92	ISSUED FOR CONSTRUCTION
	9-28-93	PHASE I AS BUILT
	6-22-95	AS BUILT 1994 AS BUILT REF. PYL

Date 7/29/91

Sheet Title
MANSARD ROOF EXPANSION JOINT DETAILS (REF. SHT. A4.1)

NO SCALE

Project No. 9002

A4.5 — Sheet No. 38/178 — 0 Revision

GOOD PRINT RATE

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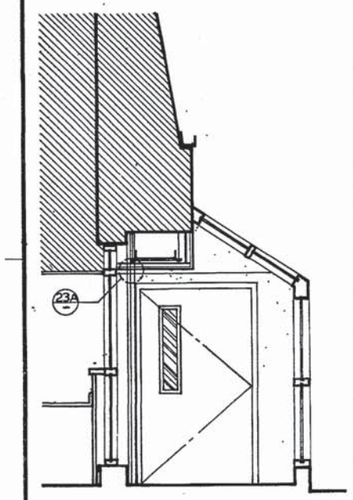
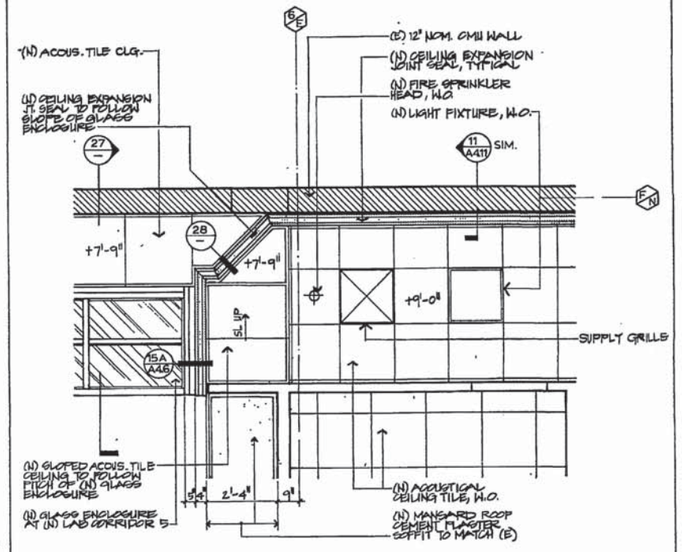
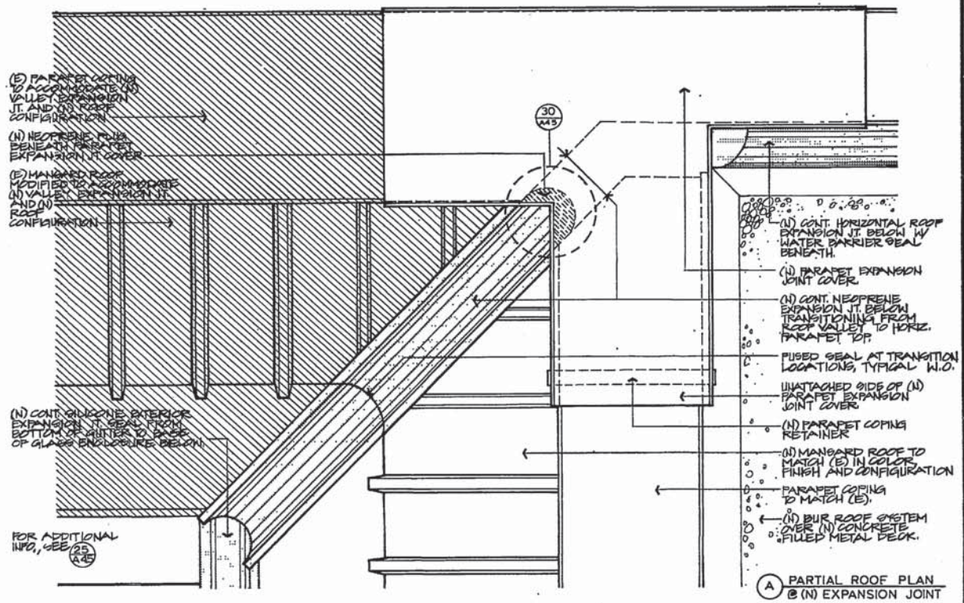


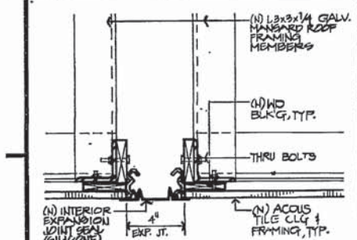
27 PARTIAL SECTION
AT (N) LAB CORRIDOR 5 1/2"=1'-0"



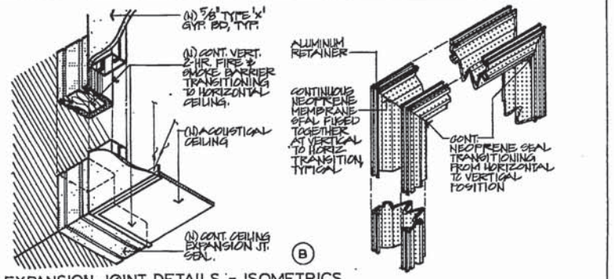
22 PARTIAL ENLARGED REFLECTED CEILING PLAN
AT (N) LAB CORRIDOR 5 AND (N) MANSARD ROOF VALLEY JOINT 1/2"=1'-0"



A PARTIAL ROOF PLAN @ (N) EXPANSION JOINT



28 CEILING EXPANSION JT-SECTION
AT (N) LAB CORRIDOR 5 3"=1'-0"



A B 23 EXPANSION JOINT DETAILS - ISOMETRICS
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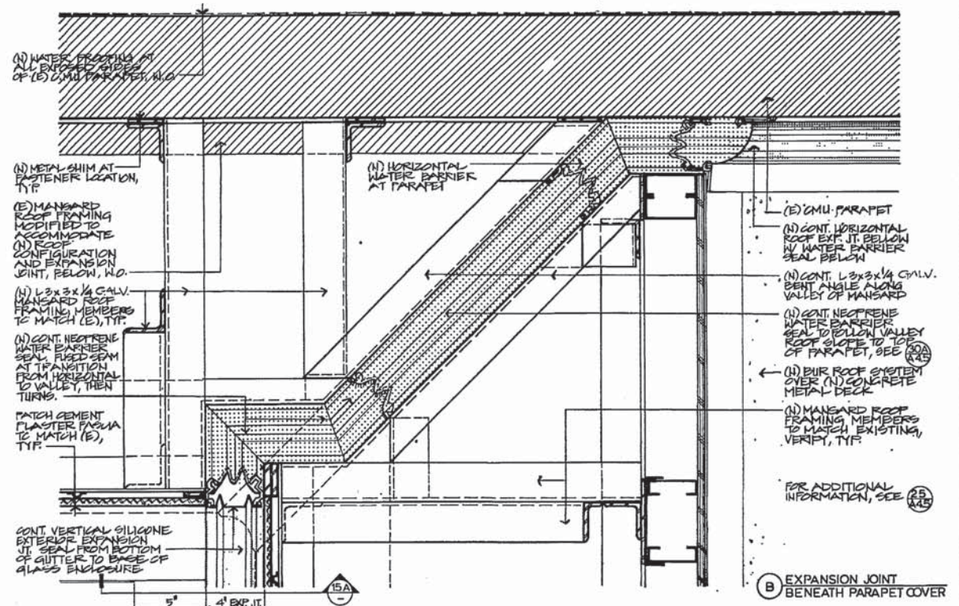
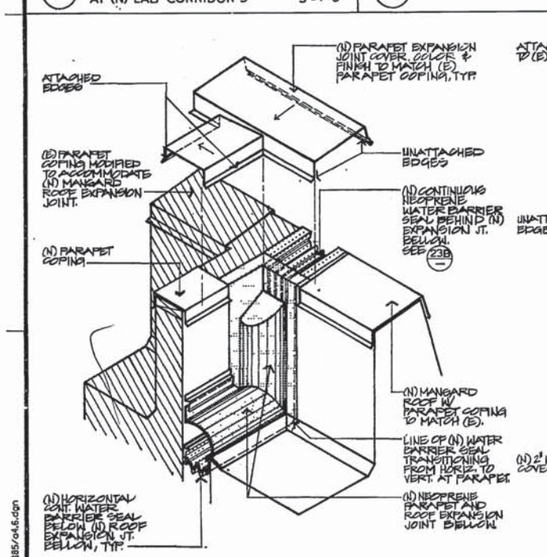
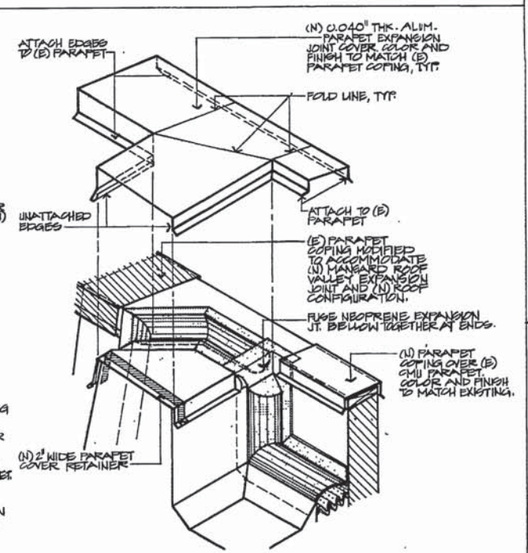


B EXPANSION JOINT BENEATH PARAPET COVER

14 PARAPET AND MANSARD ROOF DETAILS - PLAN
AT EXPANSION JOINTS (REF SHT. A4.5)

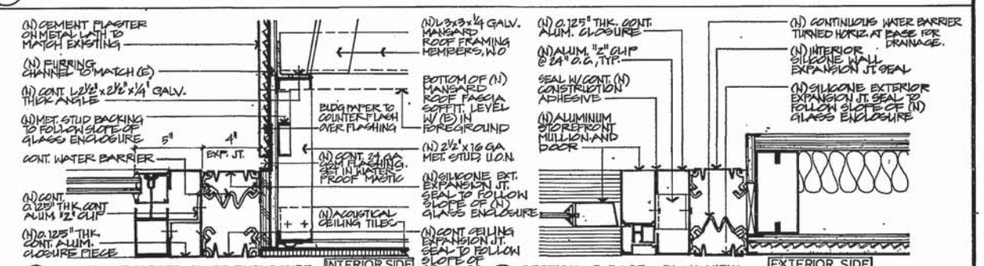


A AT OFFICE ADDITION



B AT MANSARD ROOF VALLEY AND PARAPET EXPANSION JOINT

30 PARAPET AND ROOF EXPANSION JOINT DETAILS - ISOMETRICS
(REF. SHT. 25/A4.5) NO SCALE



A SECTION AT SLOPED GLASS ENCLOSURE B SECTION AT BASE - PLAN VIEW

15 EXPANSION JOINT DETAILS
AT (N) GLASS ENCLOSURE/ LAB CORRIDOR 5 (REF. SHT A4.5)

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Issuances and Revisions

No.	Date	Description
1	1-25-96	ISSUED FOR CONSTRUCTION
	6-16-95	AS NOTED 28 AUG 1994 AS BUILT MKP-PYL

Date 7/29/91

Sheet Title

MANSARD ROOF & MISCELLANEOUS DETAILS (REF. SHT. A4.1)

SCALE: AS NOTED

Project No. 9002

A 4.6 Sheet No. 39/178 | 0 Revision

OK 6/14/96 RMM

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GENERAL NOTES

1. SCOPE OF WORK: MAKE REVISIONS TO EXISTING HVAC SYSTEMS SERVING EXISTING BUILDING AS INDICATED. PROVIDE NEW HVAC SYSTEMS FOR THE NEW BUILDING ADDITIONS.
2. WORK TO INCLUDE THE FOLLOWING:
   - A. DEMOLITION.
   - B. REPLACE EXISTING AHU UNITS AND EXHAUST FANS (U.O.N.) SERVING EXISTING BUILDING.
   - C. REVISE AND ADD DUCTWORK AND PIPING, AS SHOWN, REPLACE AIR OUTLETS IN EXISTING BUILDING. REBALANCE SYSTEMS.
   - D. REPLACE TEMPERATURE CONTROLS.
   - E. EXTENSION OF HEATING HOT WATER PIPING FROM EXISTING MAINS TO NEW HEATING COILS.
   - F. INSTALL NEW VOLUME DAMPERS IN (E) DUCTWORK FOR BALANCING AS INDICATED OR REQUIRED.
   - G. NEW AHU SYSTEMS, CHILLER, BOILERS, DUCTWORK, PIPING, AIR OUTLETS, ETC.
   - H. NEW COMPUTERIZED TEMPERATURE CONTROL SYSTEMS TO SERVE EXISTING BUILDING AS WELL AS NEW.
2. INSTALL PIPING AND DUCTWORK PER THE SMACNA GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS AND PLUMBING SYSTEMS.
3. LOCATE FIRE DAMPERS, VOLUME DAMPERS, COIL MODULES, ETC. SO AS TO ALLOW FOR CONVENIENT ACCESS TO COMPONENTS THAT NEED PERIODIC SERVICING. KEEP AREAS IMMEDIATELY ABOVE ACCESS PANELS FREE OF ANY OBSTRUCTION.
4. FOR EXACT LOCATION OF AIR OUTLETS, COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLANS.
5. PROVIDE THERMOSTAT FOR EACH COIL MODULE/ZONE.
6. ALL INLET FLEXIBLE CONNECTIONS TO CEILING DIFFUSERS AND UNITS SHALL BE AIR TIGHT WITHOUT ANY KINKS OR BENDS.
7. ALL DUCT ELBOWS BEFORE TERMINAL BOXES SHALL BE FULL RADIUS HARD CONNECTION ELBOWS.
8. PROVIDE ACOUSTICALLY LINED DUCTWORK AT ALL DUCTWORK AS INDICATED. SEAL DISCHARGE PLENUMS AIRTIGHT WITH AEROSOL OR OTHER SUITABLE COMPOUND PER SMACNA SECTION IV, PAGE 6.2, CASINGS AND PLENUM CONSTRUCTION STANDARDS.
9. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL VALVES AND OTHER CONTROL DEVICE INSTALLATION.
10. PROVIDE VOLUME DAMPER AT EACH BRANCH TAKE-OFF AND ALL RETURN, SUPPLY AND EXHAUST BRANCHES
11. PROVIDE ACCESS PANEL FOR ALL MECHANICAL SERVICEABLE EQUIPMENT.
12. CONTRACTOR SHALL VISIT SITE AND VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING HIS BID.
13. COORDINATE LOCATION OF EQUIPMENT ON ROOF WITH ARCHITECTURAL AND STRUCTURAL DOCUMENTS.
14. PROVIDE FLEXIBLE CONNECTIONS TO DUCTWORK CONNECTED TO FANS.
15. ALLOW MINIMUM 6" OF CLEAR CEILING SPACE BETWEEN PIPING/DUCTWORK AND RECESSED CEILING LIGHTS.
16. PROVIDE DUCT ACCESS PANELS IN NEW AND EXISTING DUCTS TO SERVICE FIRE AND FIRE/SMOKE DAMPERS.
17. PROVIDE FIRE DAMPERS AT ALL DUCT PENETRATIONS OF RATED CEILINGS AND PARTITIONS (U.O.N.).
18. ALL DUCTWORK DIMENSIONS ARE NET INSIDE DIMENSIONS.
19. FOR ROOM NAMES, REFER TO ARCHITECTURAL DRAWINGS.
20. REPLACE OR REPAIR EXISTING HEATING HOT WATER AND DUCTWORK INSULATION WHERE MISSING OR DAMAGED.
21. PROVIDE ACCESS DOOR WHERE POSSIBLE IN ALL NEW DUCTWORK AT 8'-0" INTERVALS.
22. PROVIDE 12 IN.H SQUARE REMOVABLE DOORS EVERY 7 FEET ON ALL DUCTING

ALL MECHANICAL AND ELECTRICAL EQUIPMENT SHALL BE BRACED OR ANCHORED TO RESIST A HORIZONTAL FORCE ACTING IN ANY DIRECTION USING THE FOLLOWING CRITERIA:

FIXED EQUIPMENT ON GRADE	32% OF OPERATING WEIGHT
FIXED EQUIPMENT ON STRUCTURE	47% OF OPERATING WEIGHT
EMERGENCY POWER EQUIPMENT ON GRADE	45% OF OPERATING WEIGHT
EMERGENCY POWER EQUIPMENT ON STRUCTURE	60% OF OPERATING WEIGHT

FOR FLEXIBLE MOUNTED EQUIPMENT - USE 2x THE ABOVE VALUES. SIMULTANEOUS VERTICAL FORCE - USE ½ x HORIZONTAL FORCE

WHERE ANCHORAGE DETAILS ARE NOT SHOWN ON THE DRAWINGS, THE FIELD INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER AND THE FIELD REPRESENTATIVE OF THE STATE ARCHITECT.

ABBREVIATION

ABBR.	DESCRIPTION
AC.	AIR CONDITIONING SYSTEM
A.D.	ACCESS DOOR (DUCT OR PLENUM)
AP	ACCESS PANEL
CC	COOLING COIL
CER	CEILING EXHAUST REGISTER
CFM	CUBIC FEET PER MINUTE
CSD	CEILING SUPPLY DIFFUSER
DN	DOWN OR DROP
EF	EXHAUST FAN
EAD	EXHAUST AIR DAMPER
F	FILTER
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HP	HORSE POWER
IB	CONCRETE INERTIA BASE
LT	LIGHT TROFFER
MD	MOTORIZED DAMPER (CONTROL DAMPER)
OAD	OUTSIDE AIR DAMPER
P	PUMP
POD	PRODUCT OF COMBUSTION DETECTOR
RF	RETURN AIR FAN (RELIEF FAN)
RAD	RETURN AIR DAMPER
RHC	REHEAT COIL
SF	SUPPLY FAN
ST	SOUND TRAP
TCP	TEMPRATURE CONTROL PANEL
TD	TRANSFER DUCT
PH	FUME HOOD
TG	TRANSFER GRILLE
FEF	FUME EXHAUST FAN
VD	BUTTERFLY VOLUME DAMPER WITH LOCKING QUADRANT OPERATOR
WER	WALL EXHAUST REGISTER
WRR	WALL RETURN REGISTER
WSR	WALL SUPPLY REGISTER
WSR	WALL SUPPLY REGISTER
WER	WALL EXHAUST REGISTER
CPF	CAPPED FOR FUTURE
(E)	EXISTING
(TYP.)	TYPICAL
HP	HEAT PUMP
RAO	RETURN AIR OPENING
N.I.C.	NOT IN CONTRACT
U.O.N.	UNLESS OTHERWISE NOTED
C.H.	CANOPY HOOD
IW	INDIRECT WASTE PIPING
FL	FIRE PROTECTION PIPING
(N)	NEW

DUCT SYMBOLS

SINGLE LINE		DOUBLE LINE
T	BRANCH CONICAL TAKE-OFF ROUND TO ROUND	
V.D.	VOLUME DAMPER W/LOCKING QUADRANT OPERATOR	
B.D.	BACK DRAFT DAMPER	
F.D.	FIRE DAMPER W/ACCESS PANEL	
B.O.	BAROMETRIC DAMPER	
M.D.	MOTORIZED DAMPER (CONTROL DAMPER)	
S.D.	SMOKE DETECTOR WITH ACCESS PANELS	
S.D.&F.D.	SMOKE & FIRE DAMPER WITH ACCESS PANELS	
	THREE WAY TAKE OFF WITH TURNING VANES	R+D+D
R.O.D.	DUCT RISE OR DROP IN DIRECTION OF AIR FLOW WITH FULL DEPTH RADIUS TURN	
	TRANSITION RECTANGULAR DUCT TO ROUND DUCT	
	FLEXIBLE DUCT	
	CEILING SUPPLY REGISTER	
	CEILING EXHAUST OR RETURN REGISTER	
	BRANCH TAKE-OFF	RECTANGULAR
	BRANCH TAKE-OFF RECTANGULAR TO ROUND	RECT. TO ROUND
	DUCT TURN WITH AIR FOIL TURNING VANES	
	DUCT TURN FULL RADIUS	
	HIGH WALL-LOW WALL SUPPLY REGISTER GRILLE OR RETURN/EXHAUST	
	FLEXIBLE DUCT	
	TWO WAY TAKE-OFF WITH TURNING VANES	A+B
	ACOUSTICAL LINING, 1" MINIMUM UNLESS OTHERWISE NOTED.	

LEGEND

SYMBOL	ABBR.	DESCRIPTION
		DETAIL NUMBER / DRAWING NUMBER) DETAIL REFERENCE
AHU		EQUIPMENT IDENTIFICATION
10x10 / 400		NECK SIZE / CFM (TYPE)
T		NEW THERMOSTAT
T		EXISTING THERMOSTAT
T		EXISTING THERMOSTAT TO BE REMOVED OR RELOCATED
40x20		RECTANGULAR DUCT (FIRST FIGURE - WIDTH, SECOND FIGURE - DEPTH) NEW
		EXISTING DUCTWORK
		EXISTING DUCTWORK TO BE REMOVED
		(E) CER & CRR TO BE REMOVED
		(E) CSD TO BE REMOVED
		(E) COOLING COIL
		(E) COOLING COIL TO BE REMOVED OR RELOCATED
		(N) HEATING COIL
		(N) COOLING COIL
		SECTION THRU ROUND DUCT
		SECTION THRU SUPPLY / OUTSIDE AIR DUCT.
	RA	SECTION THRU RETURN AIR DUCT
	EA	SECTION THRU EXHAUST AIR DUCT
R+D+D PLAN / ELEVATION	R/D	DUCT RISE / DROP IN DIRECTION OF FLOW WITH FULL DEPTH RADIUS TURNS.
45°	E.D	EXTERIOR DAMPER WITH STRAP OPERATOR
		TURNING VANES, DOUBLE WIDTH AIR FOIL (HIGH EFFICIENCY TYPE)
	FC	FLEXIBLE DUCT
	A.L.	ACOUSTICAL LINING (SIZE SHOWN INDICATES CLEAR INSIDE SIZE)
	VIB.	VIBRATION ISOLATOR
HWRR		HOT WATER REVERSE RETURN
HWS	HWS	HOT WATER SUPPLY
HWR	HWR	HOT WATER RETURN
CHS	CHS	CHILLED WATER SUPPLY
CHR	CHR	CHILLED WATER RETURN
D	D	DRAIN
V	V	VENT
		FLOW DIRECTION IN PIPING
CPF	CPF	CAPPED FOR FUTURE
		FIRE RATED SLEEVE ASSEMBLY (G / M1.1)
	GV	GATE VALVE
	GLV	GLOBE VALVE
		BALLCENTRIC VALVE
	GK	GAUGE COCK
	CK	CHECK VALVE
	BV	BUTTERFLY VALVE
		BALANCING VALVE / CIRCUITSETTER
		CONTROL VALVE (3-WAY)
		CONTROL VALVE (2-WAY)
	PRV	PRESSURE RELIEF VALVE
	SV	SAFETY VALVE
	RV	RELIEF VALVE
	SRV	SAFETY RELIEF VALVE
	PTRV	PRESSURE AND TEMPERATURE RELIEF VALVE
		MANUAL AIR VENT / PRESSURE GAUGE W/ PET COCK / W/ PET COCK
	ST	STRAINER W/ BLOWDOWN
		THERMOMETER
	(Y)	FLOW CONTROL VALVE-FLOW MEASURING DEVICE (ANNUBAR)
		BEAM PENETRATION FOR PIPES OR DUCT.
		POINT OF CONNECTION
N(600) / (60)		EXISTING DIFFUSER TO REMAIN REBALANCE TO CFM INDICATED
		DUCT SMOKE DETECTOR

USER: RGA
DATE: 1-25-96
FILE: /SD185/STRUCT/M1.1DGN

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LAB EXPANSION PROJECT
EBMUD SD-185

EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

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EBMUD MGR. OF WASTEWATER R.P.E. NO C 30976

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Issuances and Revisions

No.	Date	Description
1	1-25-96	ISSUED FOR CONSTRUCTION ADDENDUM 1, 2 & 4
	1-25-96	AS BUILT MOD. PYL

Date 7/29/91

Sheet Title

LEGEND, SYMBOLS, ABBREVIATIONS & GENERAL NOTES

Project No. 9002

M 1.1 | 0

Sheet No. 99/178 | Revision

GOOD 12/11/97 MD

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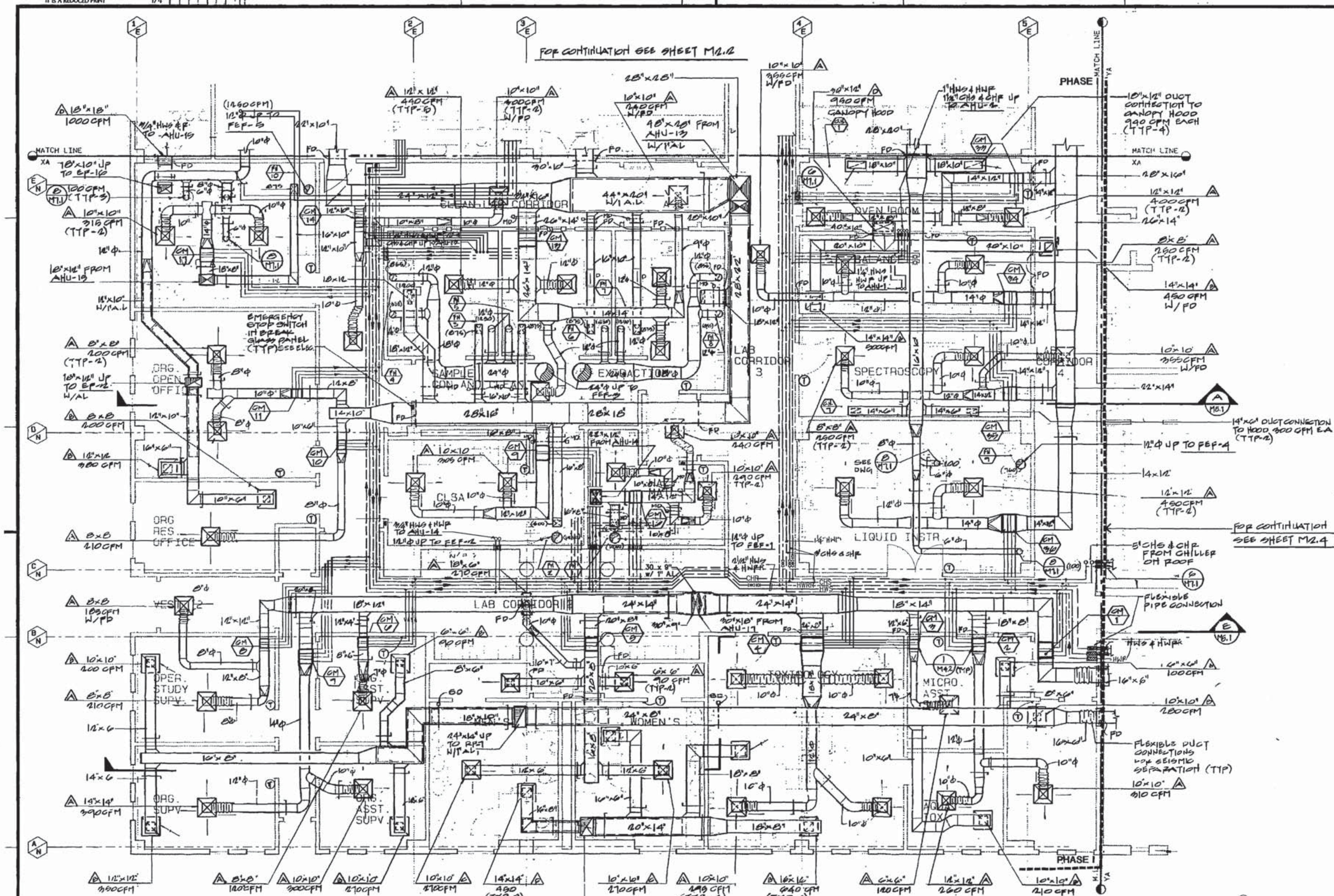
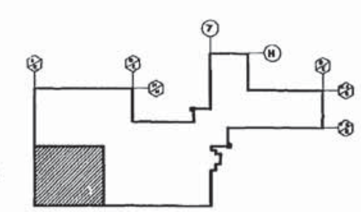


SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M.1.1
2- FOR PIPING SIZES REFER TO WATER FLOW DIAGRAM DWG M5.1
3- FOR MAKE UP AIR AND EXHAUST AIR QUANTITY TO HOODS SEE DWG M4.4
4- FOR CONNECTIONS SIZE TO FUME HOODS EXHAUST AND SUPPLY VERIFY WITH SUCCESSFUL HOOD MANUFACTURER.
5- ALL HOOD EXHAUST DUCTWORK INCLUDING CONTROL DAMPERS, VOLUME DAMPERS AND FIRE DAMPER SHALL BE STAINLESS STEEL.



PARTIAL ENLARGED FLOOR PLAN

1/4"=1'-0"

USER: RGA
DATE: 1-25-96
FILE: /SD185/MECH/M2.1.DGN

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No.	Date	Description
4	1-25-92	ISSUED FOR CONSTRUCTION ADDENDUM 4
1	9-23-93	RECORD DRAWING
	1-25-96	26 AUG 94 AS BUILT PYL

Date 7/29/91

Sheet Title

FLOOR PLAN/HVAC

1/4"=1'-0"

Project No. 8002

M 2.1 | **0**

Sheet No. 100/118 Revision

10/11/96 Good line

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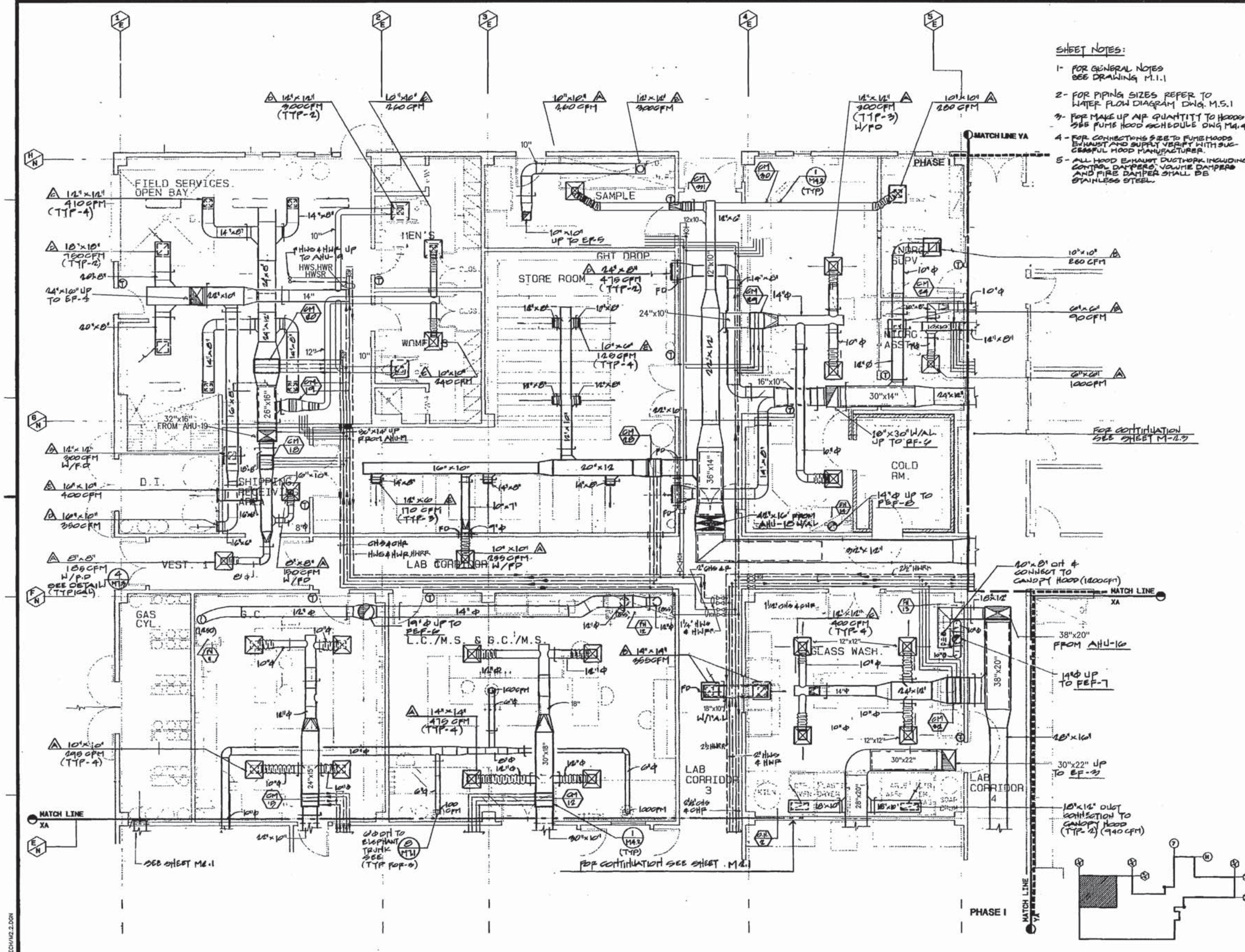

SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M.1.1
2- FOR PIPING SIZES REFER TO WATER FLOW DIAGRAM DWG. M.5.1
3- FOR MAKE UP AIR QUANTITY TO HOODS SEE FUME HOOD SCHEDULE DWG M4.4
4- FOR CONNECTIONS SIZE TO FUME HOODS EXHAUST AND SUPPLY VERIFY WITH SUCCESSFUL HOOD MANUFACTURER.
5- ALL HOOD EXHAUST DUCTWORK INCLUDING CONTROL DAMPERS, VOLUME DAMPERS AND FIRE DAMPER SHALL BE STAINLESS STEEL.

PARTIAL ENLARGED FLOOR PLAN

1/4" = 1'-0"

USER: RGA
DATE: 1-30-96
FILE: /SD185/MECH/M2.2.DGN

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Issuances and Revisions

No.	Date	Description
△	1-25-92	ISSUED FOR CONSTRUCTION ADDENDUM 4
	3-3-93	AS BUILT UPDATE
	1-30-96	26 AUG 94 AS BUILT PYL

Date 7/29/91

Sheet Title

FLOOR PLAN/HVAC

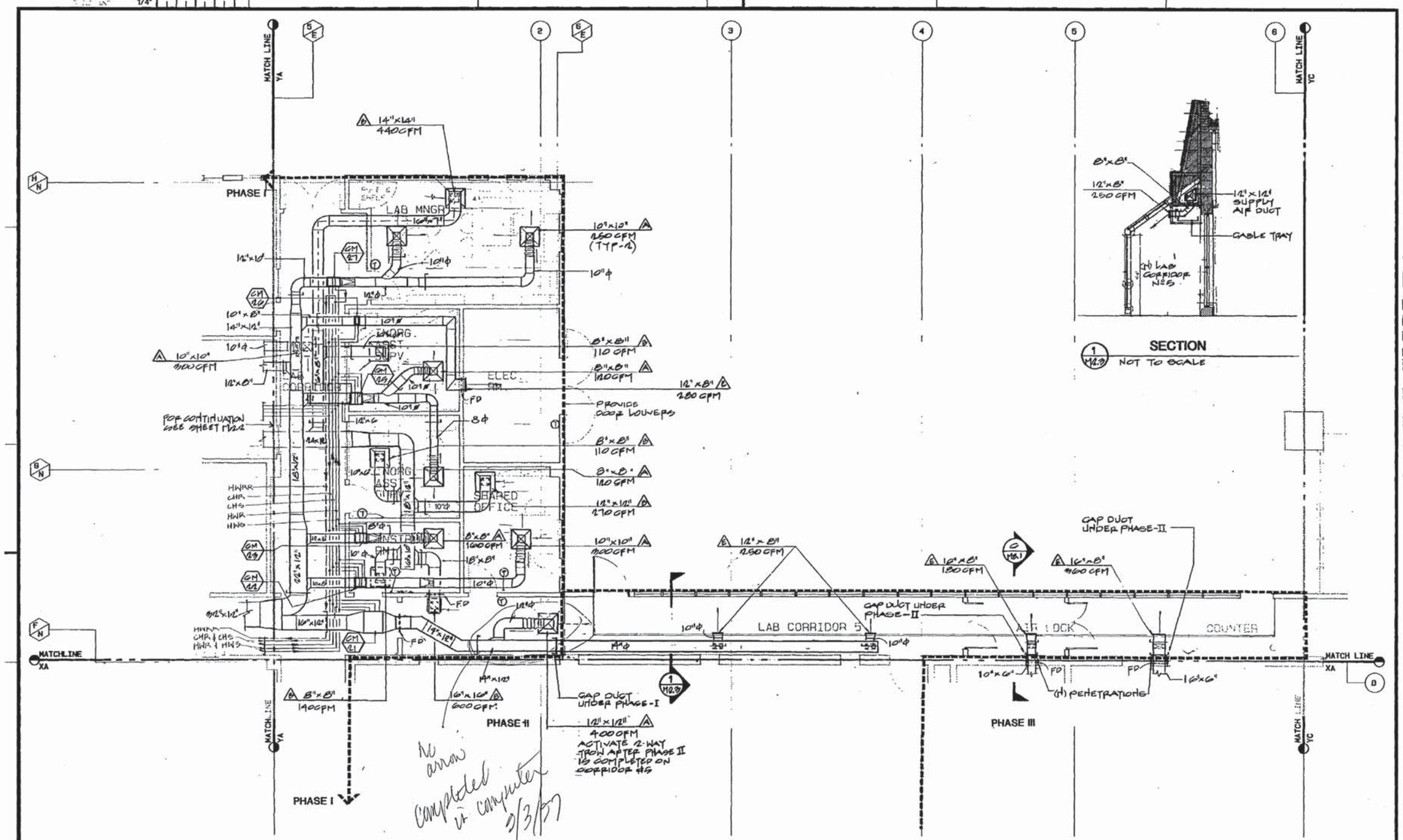
Scale: 1/4"=1'-0"

Project No. 9002

M 2.2 | 0

Sheet No. 101/178 Revision

OK 9/3/97



PARTIAL ENLARGED FLOOR PLAN

1/4" = 1'-0"

SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M.1.1

2- FOR PIPING SIZES REFER TO WATER FLOW DIAGRAM DWG. M.5.1

3- CAP PIPING & DUCTWORK WHEN THEY EXTEND INTO FUTURE PHASES OF CONSTRUCTION.

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Issuances and Revisions

No.	Date	Description
1	1-25-92	ISSUED FOR CONSTRUCTION ADDENDUM 4
	02-01-96	AS BUILT

Date 7/29/91

Sheet Title

FLOOR PLAN/HVAC

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

Project No. 3002

M 2.3 | **0**

Sheet No. 102/178 | Revision

USER: RDA
DATE: 1 FEB 96
FILE: I:\SDI88\MECH\M2.3.DGN

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1/4" 0 2 4 6 8

SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M1.1

2- FOR PIPING SIZES REFER TO WATER FLOW DIAGRAM DWG. M.5.1

3- VERIFY (E) DUCT INSULATION CONDITION & REPAIR OR PATCH IF NECESSARY. INSTALL NEW INSULATION

4- EXISTING DUCTWORK SHOWN DASHED

5- CAP PIPING & DUCTWORK WHEN THEY EXTEND INTO FUTURE PHASES OF CONSTRUCTION.

6- FOR MAKE UP AIR AND EXHAUST AIR QUANTITY TO HOODS SEE DWG M4.4

7. FOR CONNECTIONS SIZE TO FUME HOODS EXHAUST AND SUPPLY VERIFY WITH SUCCESSFUL HOOD MANUFACTURER.

8. ALL HOOD EXHAUST DUCTWORK INCLUDING CONTROL DAMPERS, VOLUME DAMPERS AND FIRE DAMPER SHALL BE 304 SS 316 STEEL.

9. NEW FIRE DAMPER IN EXISTING DUCT, REPLACE SECTION OF DUCTWORK AS REQUIRED FOR INSTALLATION TYPICAL FOR ALL NEW FIRE DAMPERS IN EXISTING DUCTS.

LAB CORRIDOR 5 FOR CONTINUATION SEE SHEET M2.3

A.L.

INORG. CHEM. LAB

INORG OPEN OFFICE

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ARCHIVES/ STORAGE

PHASE II

RAD. LAB

INSTRU.

ICP ICP/MS

MASS SPEC

BIOASSAY

MICROBIOLOGY

MEDIA KITCH

CLEAN

B CORRIDOR 6

MIC. LAB OPEN OFFICE

FULL WALL CAB

FOR CONTINUATION SEE SHEET M4.1

FOR CONTINUATION SEE SHEET M-2.5

SEE SHEET M4.5 FOR SIZE & CFM

MATCHLINE XA

MATCHLINE YA

MATCHLINE YB

CARBON FILTER CONNECT W/ TRANSITION TO HOOD

HWS & HWR WITH FLEXIBLE PIPE CONNECTIONS FOR SEISMIC SEPARATION

NEW HWS & HWR FROM NEW BOILERS

PARTIAL ENLARGED FLOOR PLAN

1/4" = 1'-0"

USER: RGA
DATE: 2/1/96
FILE: 7S0185/MECH/VAZ-4.DGN

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Issuances and Revisions

No.	Date	Description
1	1-25-96	ISSUED FOR CONSTRUCTION ADDENDUM 4
	9/9/96	AS-BUILT UPDATE
	2/1/96	AS BUILT PER RFI 94

Date: 7/29/91

Sheet Title

FLOOR PLAN/HVAC

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

Project No. 9002

M 2.4 | **0**

Sheet No. 103/178 | Revision

OK 12/18/97 - KAE

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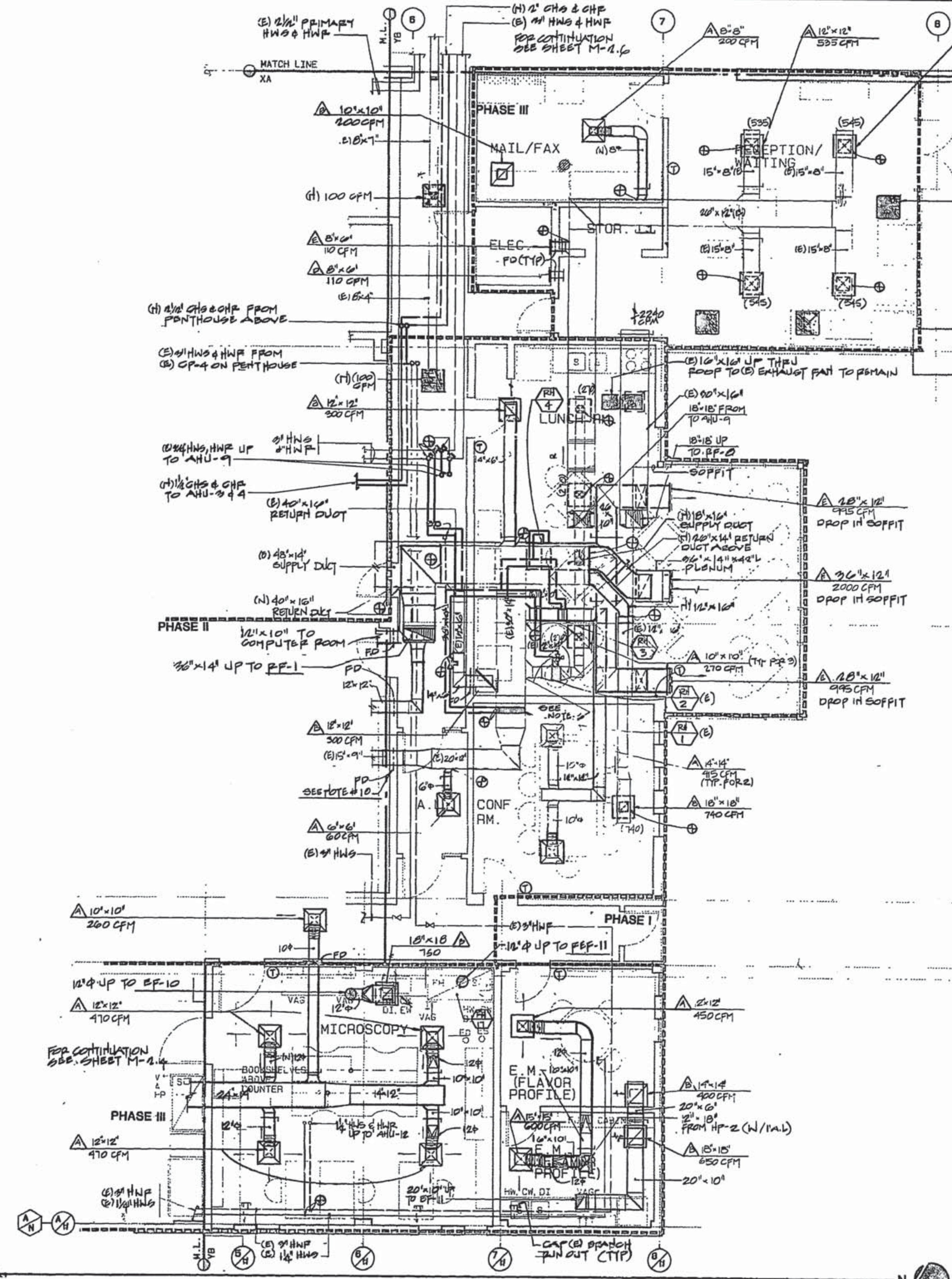
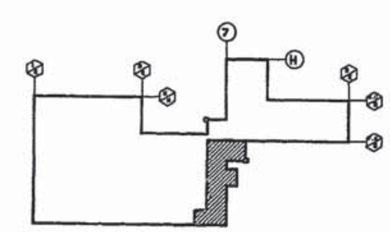


PARTIAL ENLARGED FLOOR PLAN

1/4" = 1'-0"

SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M1.1.
2- FOR PIPING SIZES REFER TO WATER FLOW DIAGRAM DWG. M.5.1.
3- EXISTING DUCTWORK SHOWN SHADED.
4- VERIFY EXISTING DUCT INSULATION CONDITION & REPAIR OR PATCH IF NECESSARY.
5- CAP PIPING & DUCTWORK WHEN THEY EXTEND INTO FUTURE PHASES OF CONSTRUCTION.
6- REPLACE (E) ELECTRIC CONTROL VALVES WITH NEW PNEUMATIC VALVES.
7- FOR MAKE UP AIR AND EXHAUST AIR QUANTITY TO HOODS SEE DWG M 4.4
8- FOR CONNECTIONS SIZE TO FUME HOODS EXHAUST AND SUPPLY VERIFY WITH SUCCESSFUL HOOD MANUFACTURER.
9- ALL HOOD EXHAUST DUCTWORK INCLUDING CONTROL DAMPERS, VOLUME DAMPERS AND FIRE DAMPERS SHALL BE STAINLESS STEEL.
10- NEW FIRE DAMPER IN EXISTING DUCT, REPLACE SECTION OF DUCTWORK AS REQUIRED FOR INSTALLATION. TYPICAL FOR ALL NEW FIRE DAMPERS IN EXISTING DUCTS.



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EBMUD MGR. OF WASTEWATER R.P.E. NO. C 32970

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Issuances and Revisions

No.	Date	Description
2	1-25-92	ISSUED FOR CONSTRUCTION
	11-19-93	AS BUILT UPDATE
	2-5-96	AS BUILT

Date: 7/29/91

Sheet Title

FLOOR PLAN/HVAC

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

Project No. 8002

M 2.5 | 0

Sheet No. 104/178 Revision

USER: RGA DATE: 2-5-96 FILE: /SD165/MECH/M2.5.DGN

AV OK 9/18/96

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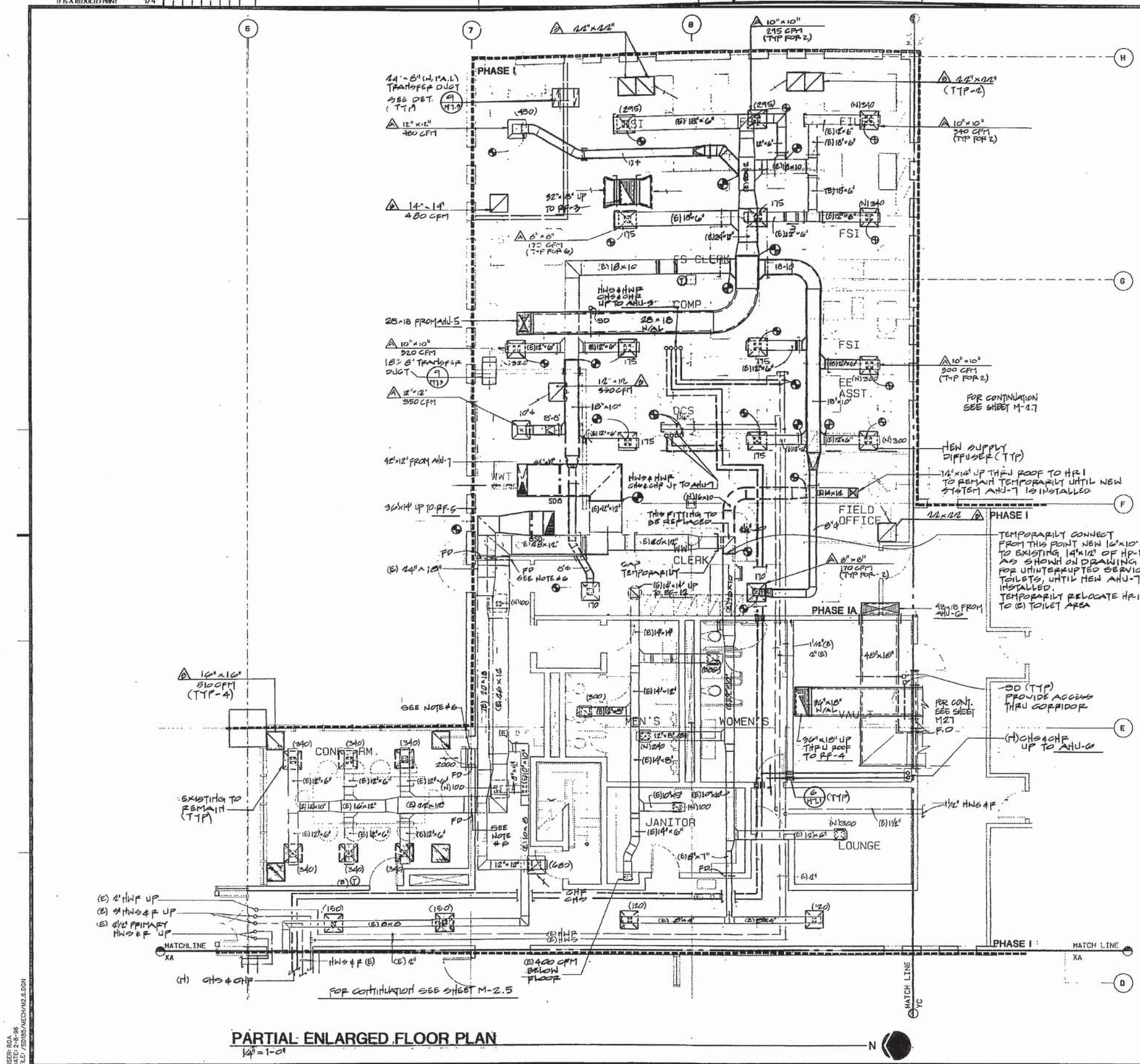
1/4" 0 2 4 6 8



PARTIAL ENLARGED FLOOR PLAN

1/4" = 1'-0"

N

SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M. 1.1

2- FOR PIPING SIZES REFER TO WATER FLOW DIAGRAM DWG. M. 5.1

3- VERIFY (E) DUCT INSULATION CONDITIONS & REPAIR OR PATCH IF NECESSARY.

4- EXISTING DUCTWORK SHOWN SHADED

5- CAP PIPING & DUCTWORK WHEN THEY EXTEND INTO FUTURE PHASES OF CONSTRUCTION.

6- NEW FIRE DAMPER IN EXISTING DUCT, REPLACE SECTION OF DUCTWORK AS REQUIRED FOR INSTALLATION TYPICAL FOR ALL NEW FIRE DAMPERS IN EXISTING DUCTS.

USER: RGA
DATE: 2-8-96
FILE: /SDSS/MECH/M2.6.DGN

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EBMUD MGR. OF WASTEWATER R.P.E. NO. C 20976

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No.	Date	Description
1	1-25-92	ISSUED FOR CONSTRUCTION
	6-4-93	RECORD DRAWINGS ALLIED MEI
	2-8-96	PLOTTED 26 AUG 94 AS BUILT BY: PYL

Date: 7/29/91

Sheet Title

FLOOR PLAN/HVAC

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

Project No. 9002

M 2.6 | **0**

Sheet No. 105/178 | Revision

GOOD 12/18

LEGEND

- EXISTING DUCTWORK, AIR OUTLETS, STRAPS, HANGERS & RELATED APPURTENANCES TO BE REMOVED.
- EXISTING DUCTWORK TO REMAIN
- EXISTING PIPING TO BE REMOVED

NOTES

1. INSTALL NEW CEILING TILES IN AREAS WHERE EXISTING DIFFUSERS & REGISTERS ARE REMOVED AND ARE NOT BEING REPLACED BY NEW. NEW CEILING TILES TO MATCH EXISTING.
2. VERIFY EXISTING CONDITIONS, BEFORE DEMOLITION, SUBMIT SHOP DRAWINGS FOR DEMOLITION AND TIE IN WITH NEW WORK.
3. REMOVE HWS & HWR BRANCHES PIPING TO TERMINAL BOX AND CAP MAIN.
4. REMOVE HWS & HWR UP THRU ROOF TO AHU UNIT & CAP AT MAIN. FILL EXISTING OPENING THRU ROOF & SEAL WATERTIGHT.
5. TB = TERMINAL BOX. C = TERMINAL CONSTANT VOLUME BOX, RCF = RECIRCULATING FAN
6. ALL PIPE SIZES SHOWN ARE EXISTING SIZES.
7. DISCONNECT 3/4" HWS & HWR RISERS FROM BRANCH & CAP AT BRANCHES

FLOOR PLAN DEMOLITION

1/8" = 1'-0"

DEMOLITION FLOR PLAN

1/0"=1'-0"

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EBMUD PROJECT MGR.
R.P.E. NO. C 31966

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No.	Date	Description
1	1-25-92	ISSUED FOR CONSTRUCTION ADDENDUM 4
		AS BUILT
	2-13-96	AS BUILT

Date 7/29/91

Sheet Title
DEMOLITION

1/8" 1'-0"

Project No. 9002

M 2.8 | 0
Sheet No. 107/178 | Revision

USER: RGA
DATE: 2-13-96
FILE: SD185/MECH/M2.8.DGN

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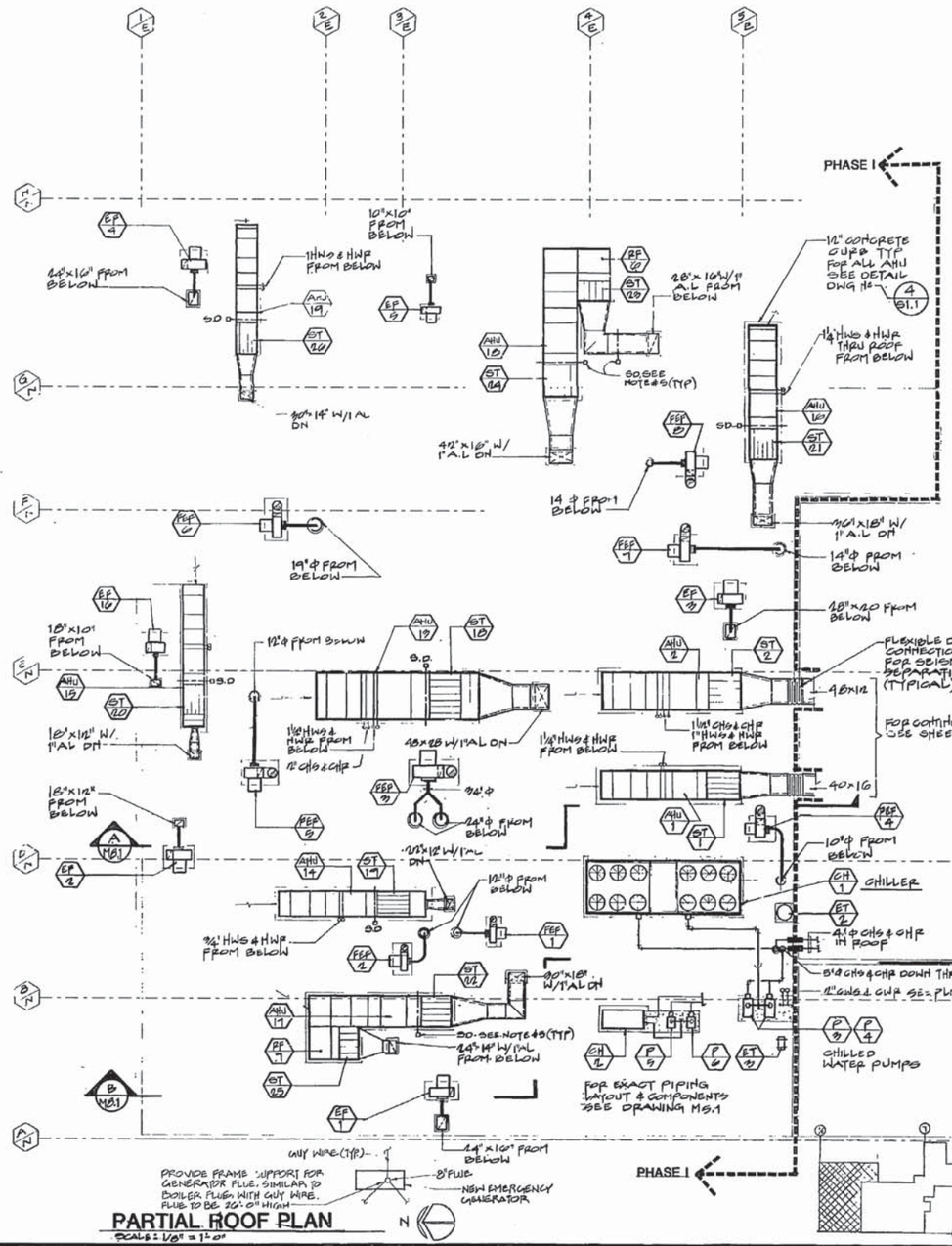
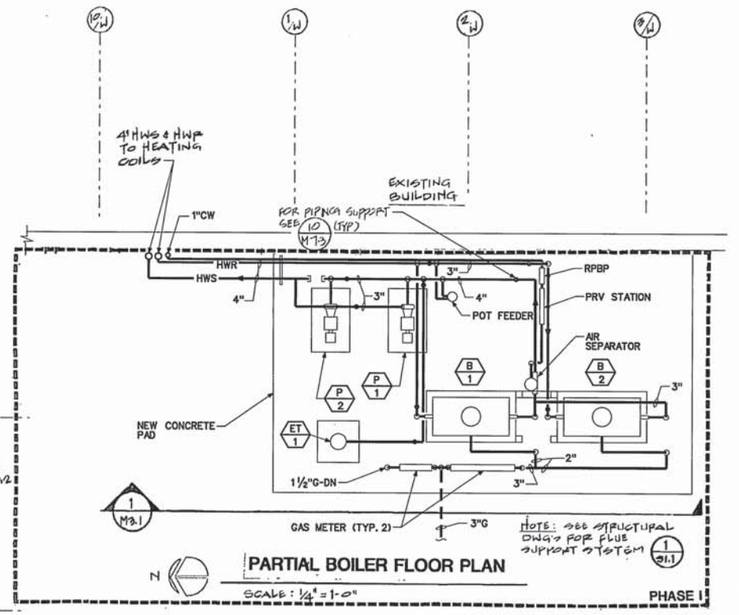
1/8" 0 4 8 12 16 1/4" 0 2 4 6 8

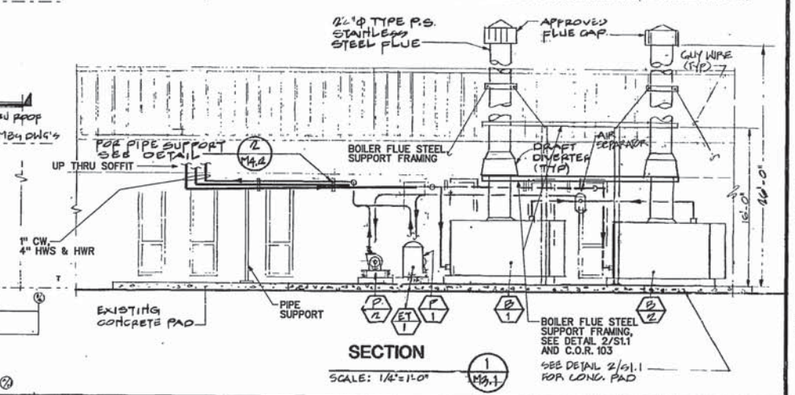
SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M. 1.1
2- FOR PIPING SIZES REFER TO WATER FLOW DIAGRAM DWG. M3.1
3- FOR VALVES ON PUMPS OF BOILERS SEE M3.1
4- FOR DETAIL OF AHU COMPONENTS SEE COMPOSITE PLAN ON DWG M3.2
5- SMOKE DETECTOR, WEATHERPROOFED (TYPICAL THIS SHEET.)

PHASE I







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Issuances and Revisions

No.	Date	Description
1	1-25-93	ISSUED FOR CONSTRUCTION ADDENDUM 4
	11-24-93	NOV. AS-BUILTS
	9-9-94	UPDATE
	7-25-95	AS NOTED 1994 AS BUILT MFP. PYL

Date: 7/29/91

Sheet Title
ROOF PLAN AND PARTIAL BOILER FLOOR PLAN

SCALE AS NOTED

Project No. 9002

M 3.1 | 0

Sheet No. 108/178 | Revision

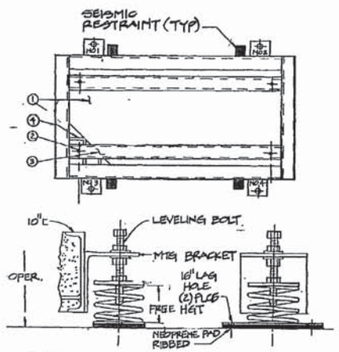
OL 9/3/97

USER: ROW
DATE: 7-25-95
FILE: P:\9002\MECH\MS1.DGN

DIETRICH PORT WORKING NO. 121089

NOTE: IF THIS SHEET IS NOT 30"x40" IT IS A REDUCED PRINT

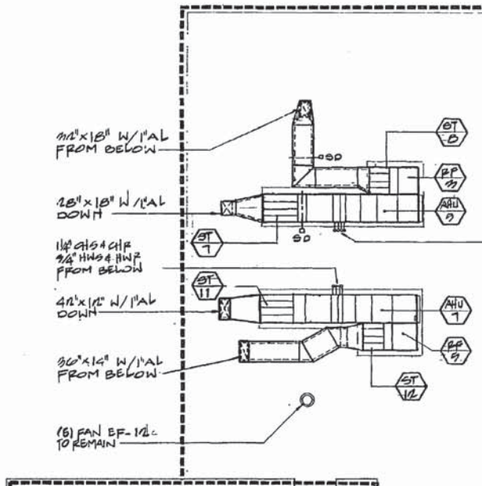
1/8" 0 4 8 12 16

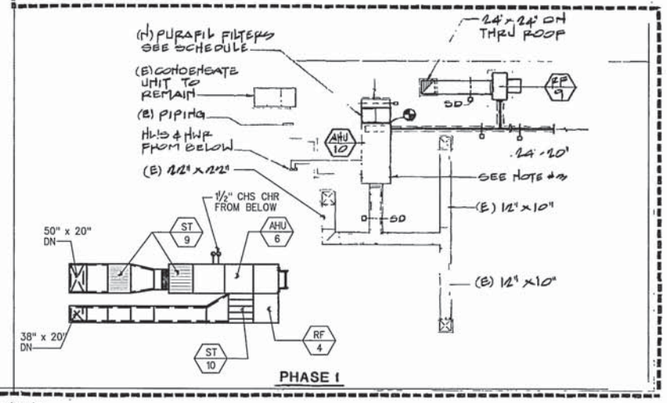


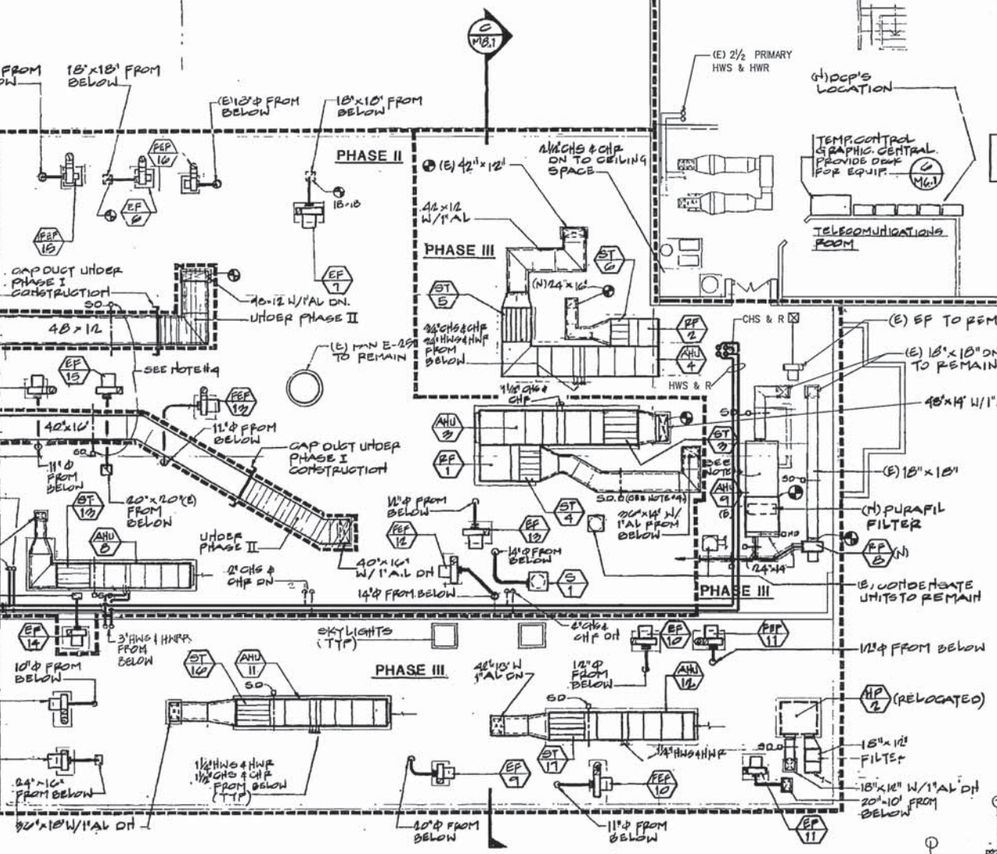
NOTES
1. APPROX. INERTIA BLK. WGT # CONCRETE BY OTHERS.
2. ¾" DIA ANCHOR BOLT TYP ( ) PLACES.
3. 2" CHANNEL MTG. TEMPLATE
4. #4 REBAR ON 12" CTRS BOTH DIRECTIONS
5. ■ S/P LOCATIONS

INERTIA BASE DETAIL 1 M3.4

NOT TO SCALE

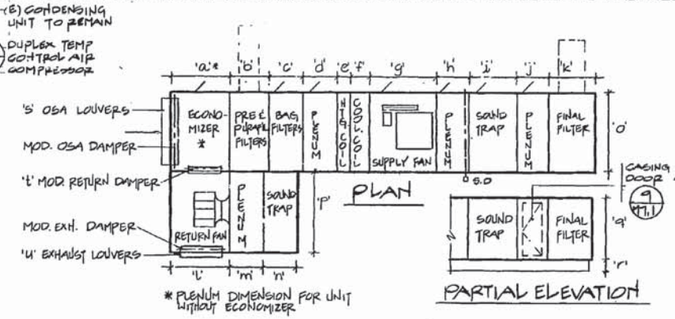






PARTIAL ROOF PLAN

1/8"=1'-0"



* PLENUM DIMENSION FOR UNIT WITHOUT ECONOMIZER

COMPOSITE AHU PLAN

NOT TO SCALE

AHU COMPONENT DIMENSIONS

UNIT No.	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u
AHU-1	21	36	30	26	6	-	47	24	36	-	-	-	-	-	54	-	40	10	48-30	-	-
AHU-2	21	36	30	26	6	13	55	24	36	-	-	-	-	-	63	-	40	10	54-36	-	-
AHU-3	40½	36	30	26	-	13	47	24	36	-	-	55½	15	36	54	63	40	10	48-30	42×30	42×30
AHU-4	49½	36	30	26	6	13	49½	21	36	-	-	49½	15	36	54	61	40	10	42×20	32×20	32×20
AHU-5	49½	36	30	26	6	13	47	24	36	-	-	49½	15	36	54	61	40	10	48×30	36×30	36×30
AHU-6	49½	36	30	26	-	13	47	24	36	-	-	49½	15	36	54	61	40	10	48×30	42×30	42×30
AHU-7	49½	36	30	26	6	13	47	21	36	-	-	49½	15	36	48	54	40	10	42×28	30×28	30×28
AHU-8	21	36	30	26	6	-	49½	24	36	-	-	-	-	-	39	-	29	8	30×18	-	-
AHU-11	21	36	30	26	6	13	47	24	36	-	-	-	-	-	54	-	34½	8	40×24	-	-
AHU-12	21	36	30	26	6	-	47	21	36	-	-	-	-	-	54	-	40	10	48×32	-	-
AHU-13	21	36	30	26	6	13	61½	24	36	15	15	-	-	-	88	-	61½	12	84×54	-	-
AHU-14	21	36	30	26	6	-	47	21	36	15	15	-	-	-	39	-	29	8	30×40	-	-
AHU-15	21	36	30	26	6	-	47	21	36	15	15	-	-	-	39	-	29	8	24×15	-	-
AHU-16	21	36	30	26	6	-	55	24	36	-	-	-	-	-	63	-	40	10	54-24	-	-
AHU-1'	49½	36	30	26	-	-	47	24	36	-	-	49½	15	36	54	-	34½	8	40×20	24×22	24×28
AHU-12	49½	36	30	26	-	-	55	24	36	-	-	49½	15	36	54	63	40	10	40×32	30×24	30×24
AHU-M	21	36	30	26	6	-	47	21	36	-	-	-	-	-	48	-	34½	8	42×22	-	-

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EBMUD LAB EXPANSION PROJECT 93-185

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Oakland, CA

EBMUD PROJECT ENG. P.E. NO. C 30959

EBMUD PROJECT MGR. P.E. NO. C 31956

EBMUD MGR. OF SUPPORT SERVICES P.E. NO. C 23317

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Issuances and Revisions

No.	Date	Description
2	1-25-92	ISSUED FOR CONSTRUCTION ADDENDUM 4
	6-4-93	RECORD DRAWING ALLIED M
	12-27-93	RECORD DRAWING UPDATE/
	2-15-96	2/5 "AS" 94 AS BUILT MIN. PYL

Date 7/29/91

Sheet Title

ROOF PLAN

1/8"=1'-0"

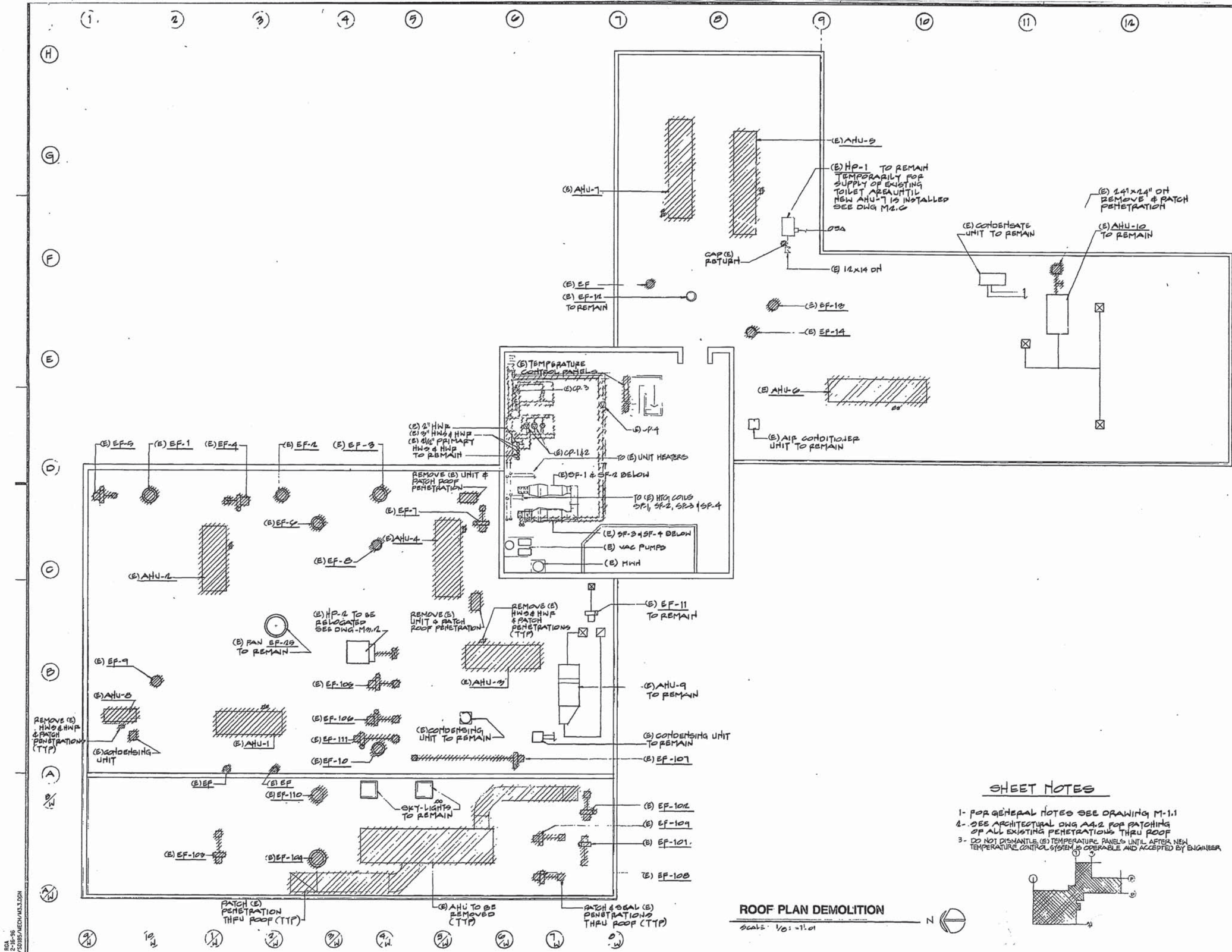
Project No. 9002

M 3.2 | **0**

Sheet No. 109/178 | Revision

USER: RCA
DATE: 2-16-96
FILE: /SD185/MECH/M3.2.DGN

GRID 12/27 96 E



ROOF PLAN DEMOLITION

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

N

SHEET NOTES

1- FOR GENERAL NOTES SEE DRAWING M-1.1
2- SEE ARCHITECTURAL DWG A4.2 FOR PATCHING OF ALL EXISTING PENETRATIONS THRU ROOF
3- DO NOT DISMANTLE (E) TEMPERATURE PANELS UNTIL AFTER NEW TEMPERATURE CONTROL SYSTEM IS OPERABLE AND ACCEPTED BY ENGINEER

USER: RGA
DATE: 2-16-96
FILE: J:\5085\MECH\M3-3.DGN

OK 9/19/96 RMC

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EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

EBMUD PROJECT ENG. R.P.E. NO. C 20659
EBMUD PROJECT MGR R.P.E. NO C 31966
EBMUD MGR. OF SUPPORT SERVICES R.P.E. NO. C 23317
EBMUD MGR. OF WASTEWATER R.P.E NO. C 30976

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Issuances and Revisions

No.	Date	Description
1	1-23-96	ISSUED FOR CONSTRUCTION ADDENDUM 2&4
	2-16-96	AS BUILT AS BUILT '94 MOD. PTL

Date 7/29/97

Sheet Title

ROOF PLAN DEMOLITION

1/8" = 1'-0"

Project No. 9002

M 3.3 | **0**

Sheet No. 16/78 | Revision

AIR HANDLING UNIT SCHEDULE

TAG	SERVICE	MANUFACTURER MODEL #	LOCATION	CFM	FAN SP IN WG	FAN MIN WHEEL DIA"	FAN RPM	MOTOR HP	MOTOR VOLT/PHASE	COOLING COIL SIZE	COOLING COIL ROW	COOLING COIL FACE AREA SF	COOLING COIL FACE VEL FPM	COOLING AIR TEMP ENT. DB	COOLING AIR TEMP ENT. WB	COOLING AIR TEMP LVG DB	COOLING AIR TEMP LVG WB	CHILLED WATER ENT °F	CHILLED WATER LVG °F	CHILLED WATER GPM	CHILLED WATER MAX PD FT.	TOTAL CAPACITY BTUH	HEATING COIL SIZE	HEATING COIL ROW	HEATING COIL FACE AREA SF	HEATING COIL FACE VEL FPM	HEATING AIRTEMP °F ENT DB	HEATING AIRTEMP °F LVG DB	HEATING HOT WATER ENT °F	HEATING HOT WATER LVG °F	HEATING HOT WATER GPM	HEATING HOT WATER MAX PD FT.	CAPACITY BTUH	DEEP BED FILTERS MANUFACTURER & TYPE	DEEP BED FILTERS NO	DEEP BED FILTERS SIZE	ODOR CONTROL FILTERS - ① MANUFACTURER & MODEL	ODOR CONTROL FILTERS NO	ODOR CONTROL FILTERS SIZE	UNIT WEIGHT LBS.	REMARKS
AHU-1	ICP, PREP, INSTR.	PACE A-15 BI	ROOF	5400	4½	15	2403	7½	460/3	—	—	—	—	—	—	—	—	—	—	—	—	—	35×93	2	10.8	463	54	55	180	150	8.16	0.74	122,412	CAMBRIDGE-HI FLOW-65SEFE	2	24×12×22	PURAFIL MODEL PC	2	24×12×20	6500	③
AHU-2	INORG. OFF. BIOLOGY	PACE A-16 BI	ROOF	6000	5½	16½	2205	10		36×52	6	13.0	461	91	67	55	48.9	44	54	97.1	3.11	278,156	35×52	2	13	461	54	75	180	150	18.6	1.09	278,964		2	24×24×22		2	24×24×20	750	
AHU-3	LUNCH RM, CONF RM	PACE A-15 BI	ROOF	4320	4½	15	2316	7½		36×48	6	10.8	400	77.5	62.8	58	51.5	44	54	14.5	.61	108,415	—													3	2	24×24×22		2	24×24×20	9,000	
AHU-4	LIBRARY, INORG OFF.	PACE A-12 BI	ROOF	6600	4½	12¼	2822	5		30×37	6	7.7	856	77.5	62	60	55.6	44	54	7.4	3.20	55,418	30×37	2	7.7	856	64.6	75	180	150	2.0	6.09	219,941		1	24×24×22		1	24×24×20	9000	
AHU-5	FIELD OFF, FS SUP	PACE A-15 BI	ROOF	4410	4½	15	2527	7½		36×48	6	10.8	408	77.4	61.8	55	52.5	44	54	15.3	1.96	118,679	36×48	2	10.8	408	64.6	82	180	150	5.5	0.42	328,712		2	24×24×22		2	24×12×20	9000	
AHU-6	MICRO SUP, COPI, CLERK	PACE A-15 BI	ROOF	4620	4½	15	2651	7½		36×48	6	10.8	428	77	63.2	59	55.8	44	54	15.1	1.80	113,098	—													5	2	24×12×22		2	24×12×20	9000	
AHU-7	CONF RM TOILETS	PACE A-17 BI	ROOF	3550	4½	19½	2620	5		30×21	2	7.7	457	78	63	60	55.1	44	54	10.4	5.85	77,932	30×37	2	7.7	457	64	78	180	150	9.5	0.41	551,22		1	24×24×22		1	24×12×20	9000	
AHU-9	RECEPTION, MAIL, EX	EXIST. TRANE	ROOF	2480	4½	12 1/4	2796	5	⑥	18×45		5.6	449	76.6	61.3	55	52.5	44	54	—	—	62,850	18×45		5.64	449	66	80	180	150	2.4		36,426		1	24×20×22		1	24×20×20	4500	
AHU-10	FIELD OFF, SUP, FS SUP	EXIST. TRANE	ROOF	4160	4½	19½	2779	7½	①	30×45		9.4	443	76.9	61.6	56	52.5	44	54	—	—	109,325	30×45		9.4	443	65.1	80	180	150	4.3		64,247		⑭	24×24×22		2	24×24×20	3500	EXIST. AIR HANDLER ②⑧
AHU-11	MICROBIOLOGY	PACE A-15 BI	ROOF	3870	4½	19½	2704	7½		30×48	6	9.0	430	91	67	58	54.5	44	54	20.2	3.81	151,510	30×48	2	9.0	430	54	78	180	150	12.9	0.51	183,902		2	24×24×22		2	24×24×20	6500	
AHU-12	KITCHEN, CLEAN RM	PACE A-15 BI	ROOF	5210	4½	15	1760	7½		—	—	—	—	—	—	—	—	—	—	—	—	—	36×48	2	10.8	467	54	55	180	150	7.9	0.76	118,163		2	24×12×22		2	24×12×20	3500	
AHU-13	SAMPLE RCVG, LAB, OFF	PACE A-20 AF	ROOF	14,200	5½	24½	1106	25		2-22×77	6	30.5	469	71	57	80	64.9	44	54	42.0	—	171,492	2-22×77	2	30.5	469	54	55	180	150	21.4	1.21	322,055		6	24×24×22		6	24×24×20	11,200	⑤
AHU-14	HAZ. MAT	PACE A-12 BI-N	ROOF	1445	5	12¼	2560	5		—	—	—	—	—	—	—	—	—	—	—	—	—	25×22	2	5.0	384	54	66	180	150	3.4	2.42	49,339		1	24×24×22		1	24×24×20	2,500	⑤
AHU-15	V.O.A.	PACE A-12 BI-SW1	ROOF	1505	5	12¼	2640	5		—	—	—	—	—	—	—	—	—	—	—	—	—	25×22	2	5.0	226	54	55	180	150	2.9	3.49	84,789		1	24×24×22		1	24×24×20	2,500	⑤
AHU-16	OVEN, balances, OFFICE	PACE A-16 BI	ROOF	6220	4	16½	2105	7½		—	—	—	—	—	—	—	—	—	—	—	—	—	35×52	2	13.0	479	54	55	180	150	9.4	1.17	141,067		2	24×24×22		2	24×24×20	6000	
AHU-17	SUP. OFF'S, TOXICOL.	PACE A-15 BI	ROOF	4445	4	15	.2211	5		—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—		3	24×24×22		3	24×24×20	9000	
AHU-18	IP CONF. STORG, LAB MISC	PACE A-16 BI	ROOF	5490	4	16½	2005	7½		—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—		2	24×24×22		2	24×24×20	6000	
AHU-19	FIELD SUP, TOILETS	PACE A-12 BI	ROOF	2815	4	12¼	2776	5		—	—	—	—	—	—	—	—	—	—	—	—	—	30×37	2	7.7	379	54	55	180	150	4.4	0.53	66205		2	24×20×22		2	24×20×20	6000	
AHU-8	BIOASSAY	PACE A-20 I-SW1	ROOF	1480	4	12¼	2765	5															22×48	2	5.0	296	54	54	180	150	2.13	0.74	31968		1	24×24×22		2	24×20×20	2,200	

① INDICATES W/2" ECO-AIR PLEATED MEDIA PREFILTERS @ 25-30% EFFICIENCY. ALL FILTER WITHIN SIDE ACCESS HOUSINGS.
② BASE MODEL NO. USED TO ESTABLISH QUALITY. SEE SPECIFICATIONS FOR ALTERNATE MFR'S.
③ PROVIDE WITH ABSOLUTE FILTERS, SEE SCHEDULE SH. M4.3.
④ REPLACE EXISTING FILTERS W/NEW FILTERS.
⑤ DIRECT EXPANSION COOLING COIL ⑥ REPLACE EXISTING 2HP MOTOR W/NEW 3HP MOTOR
⑦ REPLACE EXISTING 7½HP MOTOR W/NEW 10HP MOTOR. ⑧ REPLACE (E) HEATING COIL CONTROL VALVE & REPLACE BELTS & DRIVE REPLACE BELT & DRIVE ⑨ SOUNDTRAP AS SCHEDULED TO BE PART OF AIR HANDLING UNIT.

FAN SCHEDULE

TAG	SERVICE	LOCATION	MANUFACTURER MODEL #	TYPE	CFM	S.P. IN. WG	MIN. WH. DIA.	DISCH	OUTLET VEL. FPM.	FAN RPM	MOTOR HP	MOTOR V.	MOTOR PH.	MOTOR CY	UNIT WEIGHT LBS.	REMARKS
RF-1	AHU-3	ROOF	PACE PF 20AF	PLUG	3910	1"	20"	—	—	1157	1½	460	3	60	1900	
RF-2	AHU-4	ROOF	PACE PF-15BI	PLUG	2590	1"	15"	—	—	1626	1	460	3	60	1400	
RF-3	AHU-5	ROOF	PACE PF-20AF	PLUG	5150	1"	20"	—	—	1124	1½	460	3	60	1900	
RF-4	AHU-6	ROOF	PACE PF-20AF	PLUG	4060	1"	20"	—	—	1176	2	460	3	60	1900	
RF-5	AHU-7	ROOF	PACE PF-16BI	PLUG	2920	1"	16½	—	—	1545	1½	460	3	60	1500	
RF-6	AHU-18	ROOF	PACE PF-16BI	PLUG	2890	1"	16½	—	—	1631	1½	460	3	60	1400	
RF-7	AHU-17	ROOF	PACE PF-15BI	PLUG	2100	1"	15"	—	—	1529	1	460	3	60	1400	
RF-8	AHU-9	ROOF	TWIN CITY 165 BCV	UTILITY	2240	1"	16½	—	1427	1216	¾	460	3	60	260	WEATHER PROOFED
RF-9	AHU-10	ROOF	TWIN CITY 220 BCV	UTILITY	4660	1"	20"	—	1591	1004	1½	460	3	60	380	
EF-1	TLTS GEN. EXH	ROOF	TWIN CITY 150 BCV	UTILITY	2160	¾"	15"	—	1589	1332	¾	460	3	60	240	
EF-2	GEN. EXH. CANOPY HOODS	ROOF	TWIN CITY 122 BCV	UTILITY	1180	5/8"	12¼	—	1372	1440	½	460	3	60	950	
EF-3	GLASS WASH AND PREP	ROOF	TWIN CITY 122 BCV	UTILITY	4300	¾"	22¼	—	1509	847	1½	460	3	60	380	
EF-4	GEN. EXH FIELD SERVICE	ROOF	TWIN CITY 182 BCV	UTILITY	2750	1"	18 1/4	—	1432	1076	1	460	3	60	340	
EF-5	SAMPLE GEN. EXH.	ROOF	TWIN CITY 75 FCJ	UTILITY	300	1/2"	7 11/16	—	923	1154	1/6	20	1	60		
EF-6	INORG. CHEM. CANOPY HOOD	ROOF	TWIN CITY 150 BCV	UTILITY	2000	¾"	15"	—	1550	1313	¾	460	3	60	240	
EF-7	INORG. CHEM. CANOPY HOOD	ROOF	TWIN CITY 150 BCV	UTILITY	2000	¾"	15"	—	1550	1313	¾	460	3	60	240	
EF-8	MICRO BIOLOGY	ROOF	TWIN CITY 182 BCV	UTILITY	2820	¾"	18 1/4	—	1409	1018	¾	460	3	60	335	
EF-9	MICRO KITCHEN CANOPY HOOD	ROOF	TWIN CITY 150 BC	UTILITY	2000	¾"	15"	—	1550	1313	¾	460	3	60	240	
EF-10	MICROSCOPY GEN. EXH.	ROOF	TWIN CITY 105 BCI	UTILITY	750	¾"	10½	—	1172	1607	¼	120	1	60	125	
EF-11	FLAVER PROFILE GEN. EXH.	ROOF	TWIN CITY 133 BCV	UTILITY	1050	5/8"	12 1/4	—	1221	1949	⅓	120	1	60	190	
EF-13	PREP LAB CANOPY HOOD	ROOF	TWIN CITY 105 BCI	UTILITY	600	¾"	10½	—	938	1466	.14	120	1	60	125	
EF-14	BIOASSAY	ROOF	TWIN CITY 122 BCV	UTILITY	1300	¾"	12 1/2	—	1512	1582	½	460	3	60	200	
EF-15	ICP	ROOF	TWIN CITY 150 BCV	UTILITY	2550	1"	15"	—	2006	1312	1½	460	3	60	240	
EF-16	GAS CYL	ROOF	TWINCITY 102 BCV	UTILITY	1200	3/8"	12 1/2	—	1164	1178	¼	120	1	20	190	

SOUND TRAP SCHEDULE

TAG	SYSTEM SERVED	IAC TYPE	TRAP AREA SF	DESIGN FACE VEL FPM	OVERALL DIM. W" X D" X L"	MAX PD IN W.G.	REMARKS
ST-1	AHU-1	½ MS	12.0	417	48 x 36 x 36	0.06	①
ST-2	AHU-2	½ MS	13.0	417	60 x 36 x 36	0.06	
ST-3	AHU-3	½ MS	12.0	360	48 x 36 x 36	0.05	
ST-4	RF-1	½ MS	15.0	261	60 x 36 x 36	0.05	
ST-5	AHU-4	½ MS	10.5	247	42 x 36 x 36	0.05	
ST-6	RF-2	½ MS	12.0	216	48 x 36 x 36	0.04	
ST-7	AHU-5	½ MS	12.0	368	48 x 36 x 36	0.06	
ST-8	RF-3	½ MS	15.0	250	60 x 36 x 36	0.05	
ST-9	AHU-6	½ MS	12.0	385	48 x 36 x 36	0.06	
ST-10	RF-4	½ MS	15.0	271	60 x 36 x 36	0.05	
ST-11	AHU-7	½ MS	10.5	335	42 x 36 x 36	0.06	
ST-12	RF-5	½ MS	12.0	243	48 x 36 x 36	0.05	
ST-13	AHU-8	½ MS	6.0	247	36 x 24 x 36	0.06	
ST-14	AHU-9	½ MS	—	—	—	—	EXISTING UNIT
ST-15	AHU-10	½ MS	—	—	—	—	EXISTING UNIT
ST-16	AHU-11	½ MS	10	387	48 x 30 x 36	0.06	
ST-17	AHU-12	½ MS	12	420	48 x 36 x 36	0.06	
ST-18	AHU-13	½ MS	35.0	406	84 x 60 x 36	0.06	
ST-19	AHU-14	½ MS	6.0	320	36 x 24 x 36	0.06	
ST-20	AHU-15	½ MS	6.0	188	36 x 24 x 36	0.06	
ST-21	AHU-16	½ MS	15.0	407	60 x 36 x 36	0.06	
ST-22	AHU-17	½ MS	10.0	491	48 x 30 x 36	0.06	
ST-23	RF-6	½ MS	5.0	566	48 x 15 x 30	0.09	
ST-24	AHU-18	½ MS	12.0	430	48 x 36 x 36	0.06	
ST-25	RF-7	½ MS	15.0	140	60 x 36 x 36	0.05	
ST-26	AHU-19	½ MS L	10.5	274	42 x 30 x 36 42 x 30 x 36	0.04	

① BLANK UNUSED PORTION OF PLENUM.
② SOUND TRAPS TO BE PART OF AIR HANDLING UNIT/FACTORY INSTALLED.

CHILLER SCHEDULE

TAG	LOCATION	CAPACITY IN TONS	EVAPORATOR GPM	EVAPORATOR ENT. °F	EVAPORATOR LVG °F	EVAPORATOR PD. FT.	EVAPORATOR BOILING FACTOR	AIR COOLED CONDENSER CFM	AIR COOLED CONDENSER AMBIENT °F.	COMPRESSORS NO.	COMPRESSORS FLA EA	COMPRESSORS FAN VOLT	COMPRESSORS PHASE	COMPRESSORS HZ	COMPRESSORS NO.	COMPRESSORS KW INPUT	COMPRESSORS RLA EA	COMPRESSORS LRA EA	UNIT ELECTRICAL CHARACTERISTICS VOLTS	UNIT ELECTRICAL CHARACTERISTICS PHASE	UNIT ELECTRICAL CHARACTERISTICS HZ	MCA	MOCP	ICF	UNIT OPERATING WEIGHT	REMARKS
1	NEW ROOF	199.4	319	59	44	9.2	0.00025	17,600	95°	1	3.0	460	3	60	8	229.2	51.0	459	460	3	60	457	500	684	15,100 LBS.	UL. LISTED
2	NEW ROOF	11.2	27.0	68	58	12.5	0.0009	10,150	95°	2	1.8	460	3	60	1	11.5	19.3	96	460	3	60	—	33	104.8	4681 LBS.	UL. LISTED ①

RLA = RATED LOAD AMPS; LRA = LOCKED ROTOR AMPS; MCA = MIN. CIRCUIT AMPS; MOCP = MAX. OVERCURRENT PROTECTIVE DEVICE AMPS). ICF = MAX. INSTANTANEOUS CURRENT FLOW.
① WITH OPTIONAL HEAD PRESSURE CONTROL TO 60°F AMBIENT TEMPERATURE.

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Architect Reg. No.

LAB EXPANSION PROJECT SD-185
EBMUD
EAST BAY MUNICIPAL UTILITY DISTRICT
Oakland, CA

EBMUD PROJECT ENG. R.P.E. NO. C 39959
EBMUD PROJECT MGR. R.P.E. NO. C 31966
EBMUD MGR. OF SUPPORT SERVICES R.P.E. NO. C 33317
EBMUD MGR. OF WASTEWATER R.P.E. NO. C 30976

REGISTERED PROFESSIONAL ENGINEER MASAO TAKAHASHI No. 11286 MECHANICAL STATE OF CALIFORNIA

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Issuances and Revisions

No.	Date	Description
1	1-25-92	ISSUED FOR CONSTRUCTION ADDENDUM 2
	2-19-96	AS BUILT NOV-PYL

Date 7/29/91
Sheet Title
SCHEDULES
Project No. 9002
Sheet No 111/178 — M 4.1 — 0 Revision

USER: BCA
DATE: 2-19-96
FILE: /SD185/MECH/M4.1.DGN

OK 9/19/96

AIR OUTLET SCHEDULE

TAG △	SERVICE	CARNES MODEL NO. (J.O.N)	DESCRIPTION	REMARKS
A	SUPPLY	SPEA	PERFORATED FACE, SQUARE OR RECT. NECK, FRAME #4 FOR 24"x24" LAY-IN APPLICATION, ADJUSTABLE BATTEN CONTROLLER	W/KRA OPPOSED BLADE DAMPER
B	RETURN/EXHAUST	SPPA	PERFORATED FACE, SQUARE NECK, FRAME #2 FOR 24"x24" LAY-IN APPLICATION.	" " " "
C	SUPPLY	SKFA **	STAMPED LOUVER DIFFUSER, F-FRAME, SQUARE NECK, SURFACE MOUNTED, W/KRA EQUALIZING DEFLECTOR.	W/KRA OPPOSED BLADE DAMPER
D	RETURN/EXHAUST	RTAAH	HORIZONTAL FIXED BLADE REGISTER W/ HORIZONTAL FACE BARS AT 45°	W/OPPOSED BLADE DAMPER
E	SUPPLY	RTDAH	DOUBLE DEFLECTION REGISTER HORIZONTAL FACE BARS	W/OPPOSED BLADE DAMPER
F	SUPPLY	RMD 3PD*	24"x24" LAY-ON MODUVAR 4 CORE SQUARE DIRECTIONAL DIFFUSER, W/ FILTER PANEL	

* AHEMOSTAT OR EQUAL
** AT EXPOSED DUCTS USE 'B' FRAME

EQUIPMENT VIBRATION ISOLATION SCHEDULE

SYSTEM NO	DESCRIPTION	ISOLATOR TYPE DETAIL	N	FRAME TYPE	DEFLECTION (INCH)	SEISMIC RESTRAINT QUANTITY	SEISMIC RESTRAINT DETAIL NO	REMARKS
B-1 & B-2	BOILERS	PM (11/M7.2)		--	1/2"	2 ea. DET.	2, DET.	
CH-1	CHILLERS	MS (4/M7.2)	6	A (4/M7.2)	2 1/2"	8	1/M7.2	
P-1, P-2	PUMPS	MS (2/M7.2)	4	B (4/M7.2)	2 1/2"	4	1/M7.2	
P-3, P4	PUMPS	MG (3/M7.2)	4	B (4/M7.2)	2 1/2"	4	1/M7.2	
AHU-1 THRU-7 & 11 THRU 19	AIR HANDLING UNITS	—	—	B (4/M7.2)	2 1/2"	—	4 M7.2	INTERNAL FAN ISOLATORS & SEISMIC RESTRAINT W/UNITS.
HP-2 (6)	HEAT PUMP	MS (4/M7.2)	4	B (4/M7.2)	1 1/2"	4	1/M7.2	
EF/FEP	EXHAUST FANS	MS (4/M7.2)	4	B (4/M7.2)	1"	4	1/M7.2	FOR ALL EXHAUST FANS AND FUME HOOD EXHAUST FANS.
P3, P6	PUMPS	MS (2/M7.2)	4	B (4/M7.2)	2 1/2"	4	1/M7.2	
CH-2	CHILLER	MS (4/M7.2)	4	B (4/M7.2)	2 1/2"	4	1/M7.2	
TCP	AIR COMPRESSOR	MS (4/M7.2)	4	B (4/M7.2)	2 1/2"	4	1/M9.2	

* FRAME ONLY WITHOUT ISOLATOR SUPPORT FRAME. TEMP-C AIR COMPRESSOR

PUMP SCHEDULE

TAG NO	LOCATION	SERVICE	OPER TEMP °F	GPM	PUMP HEAD FT. H_2O	SIZE	RPM	MOTOR * HP	MOTOR * VOLTS	MOTOR * PH/CY	MANUFACTURER AND MODEL NO.
1	ON GRADE	HEATING HOT WATER	180°	144	78	4" x 1 1/2"	1760	7 1/2	460	3/60	B+G 1510-2 1/2 BD WEATHERPROOFED
2	ON GRADE	HEATING HOT WATER	180°	144	75	4" x 1 1/2"	1760	7 1/2	460	3/60	B+G 1510 2 1/2 BD WEATHERPROOFED
3	ROOF	CHILLED WATER	44°	160	85	4" x 2 1/2"	1760	7 1/2	460	3/60	B+G 1510-2 1/2 BD WEATHERPROOFED
4	ROOF	CHILLED WATER	44°	160	85	4" x 2 1/2"	1760	7 1/2	460	3/60	B+G 1510-2 1/2 BD WEATHERPROOFED
5	ROOF	EQUIP. COOLING WATER (ECW)	58°	27	81	1 1/2" x 1 1/2"	1760	2	460	3/60	B+G 1501-1 1/2 DC WEATHERPROOFED
5**	ROOF	EQUIP. COOLING WATER (ECW)	58°	27	81	1 1/2" x 1 1/4"	1760	2	460	3/60	B+G 1501-1 1/2 DC WEATHERPROOFED

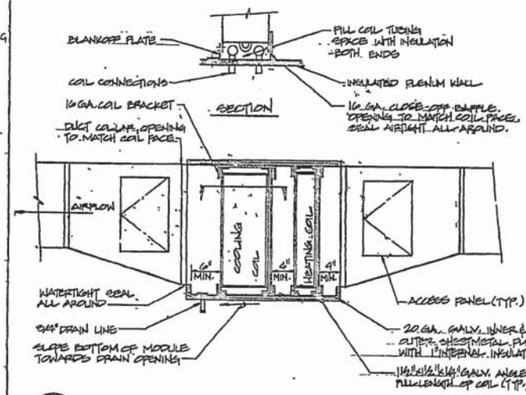
* TEFC HIGH EFFICIENCY
** STAND BY

BOILER SCHEDULE

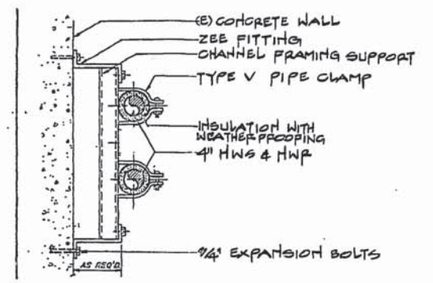
TAG NO	LOCATION	HOT WATER MBH INPUT	HOT WATER MBH OUTPUT	GAS TYPE	GAS CFH	WATER ENT °F	WATER LVG °F	WATER GPM	HEATING SURFACE SQ. FT.	OPERATING WEIGHT LBS.	MANUFACTURER AND MODEL NO.
1	ON GRADE	2700	2160	NATURAL	2700	150	180	144	322	4100	B+G SERIES 2 2700 WEATHERPROOFED
2	ON GRADE	2700	2160	NATURAL	2700	150	180	144	322	4100	B+G SERIES 2 2700 WEATHERPROOFED

TEMPERATURE CONTROL VALVE SCHEDULE

TAG	EQUIPMENT SERVED	SERVICE	GPM	P.D. PSIG. MAX	PNEUMATIC TYPE	
1.	AHU-1	HTG HOT WATER	7.6	1	2 WAY	MODULATING
2.	AHU-2	HTG HOT WATER	18.5	1	" "	"
3.	AHU-2.	CHILLED WATER	37.1	4	3 WAY	MODULATING
4.	AHU-3	CHILLED WATER	14.1	3	"	
5.	AHU-4	HTG HOT WATER	2.0	1	2 WAY	
6.	AHU-4	CHILLED WATER	7.4	3	3 WAY	
7	AHU-5	HTG HOT WATER	5.5	1	2 WAY	
8	AHU-5	CHILLED WATER	15.5	4	3 WAY	
9.	AHU-6	CHILLED WATER	15.1	4	3 WAY	
10	AHU-7	HTG HOT WATER	3.5	1	2 WAY	
11	AHU-7	CHILLED WATER	10.4	4	3 WAY	
12	AHU-9	HTG HOT WATER	2.4	1	2 WAY	
13	AHU-9	DX COIL				
14	AHU-10	HTG HOT WATER	4.3	1	2 WAY	
15	AHU-10	DX COIL				
16	AHU-11	HTG HOT WATER	12.9	1	2 WAY	
17	AHU-11	CHILLED WATER	20.2	4	3 WAY	
18	AHU-12	HTG HOT WATER	7.6	1	2 WAY	
19	AHU-18	HTG HOT WATER	21.4	1	3 WAY	
20	AHU-14	HTG HOT WATER	4.15	1	2 WAY	
21	AHU-15	HTG HOT WATER	1.9	1	2 WAY	
22	AHU-16	HTG HOT WATER	9.3	1	2 WAY	
23	AHU-19	HTG HOT WATER	4.4	1	2 WAY	
24	AHU-8	HTG HOT WATER	2.13	1	2 WAY	



1/M4.2 **COIL MODULE DETAIL**
NOT TO SCALE



2/M4.2 **MULTIPLE PIPE WALL BRACKET**
NOT TO SCALE

SHEET NOTES:
1- FOR GENERAL NOTES SEE DRAWING M.1.1

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EBMUD
LAB EXPANSION PROJECT
SD-185

EAST BAY MUNICIPAL UTILITY DISTRICT
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Issuances and Revisions

No.	Date	Description
1	1-25-92	ISSUED FOR CONSTRUCTION ADDENDUM 4
	2-22-96	AS BUILT INFO. PYL

Date 7/29/91
Sheet Title
SCHEDULES

Project No. 9002
Sheet No. M 4.2 | 112/178 | Revision 0

OK 9/19/96 RMS

USER: RGA
DATE: 2-22-96
FILE: /SD185/MECH/M4.2.DGN

COIL MODULE SCHEDULE

TAG (CC / HC)	SYSTEM SERVED	TYPE	SIZE	NO ROWS / FPI	CFM	AIR TEMPERATURE °F ENTERING DB	ENTERING WB	LEAVING DB	LEAVING WB	TOTAL FACE S.F.	FACE VEL. FPM	MAX PD IN W.G.	WATER GPM	WATER P.D. FT.	WATER ENT. °F	WATER LVG. °F	TOTAL CAPACITY BTUH	REMARKS
CC-1	AHU-17	⑤	15×9	6/10	380	83.5	64	55	52.3	0.94	404	0.51	1.75	3.55	44	59	13150	
HC-1	AHU-17			1/0		51.5	-	80				0.07	0.78	0.11	80	150	11696	
CC-2	AHU-17		18×12	6/10	570	83.5	64	55	52.3	1.5	380	0.45	2.63	1.51	44	59	19725	2 CIRCUITS
HC-2	AHU-17			1/8		51.5	-	80	-			0.05	1.17	0.93	180	150	17545	
CC-3	AHU-17		12×6	6/8	120	83.5	64	55	52.3	0.5	220	0.15	0.51	0.21	44	59	3807	
HC-3	AHU-17			1/8		51.5	-	75	-			0.02	0.50	0.03	180	1688	27202	
CC-4	AHU-17		24×15	6/8	1,180	83.5	64	55	52.3	2.5	472	0.66	5.49	8.86	44	59	40834	2 CIRCUITS
HC-4	AHU-17			1/8		51.5	-	75	-			0.08	2.0	1.24	180	150	29948	
CC-5	AHU-17		21×12	6/10	990	83.5	64	55	52.3	1.75	497		4.01		44	59	30106	
HC-5	AHU-17			1/8		51.5	-	80	-				2.03		180	150	30,472	
CC-6	AHU-17		12×6	6/8	120	83.5	64	55	52.3	0.5	220	0.15	0.51	0.21	44	59	3807	
HC-6	AHU-17			1/8		51.5	-	75	-			0.02	0.5	0.03	180	1688	27192	
CC-7	AHU-17		18×12	6/10	690	83.5	64	55	52.3	1.5	460	0.59	3.18	2.38	44	59	23877	
HC-7	AHU-17			1/8		51.5	-	80	-			0.07	1.42	0.46	180	150	21238	
CC-8	AHU-17		15×9	6/10	395	83.5	64	55	52.3	0.94	420	0.54	1.83	3.80	44	59	13069	
HC-8	AHU-17			1/10		51.5	-	80	-			0.08	0.81	0.12	180	150	12158	
CC-9	AHU-13		18×12	6/8	610	80.0	63.5	59	55.2	1.5	407	0.34	1.04	2.17	44	59	16972	
HC-9	AHU-13			1/8		55	-	74	-			0.06	0.84	0.18	180	150	12517	
CC-10	AHU-13		12×6	6/8	210	80.0	63.5	55	52.5	0.5	420	0.61	.45	1.17	44	59	6813	
HC-10	AHU-13			1/8		55	-	80	-			0.06	0.5	0.03	180	157	5670	
CC-11	AHU-13		15×9	6/10	400	80.0	63.5	55	52.5	0.94	426	0.51	.86	6.06	44	59	12978	
HC-11	AHU-13			1/8		55	-	80	-			0.07	0.72	0.09	180	150	10800	
CC-12	AHU-13		30×18		1900	80.0	63.5	59	55.2	3.75	427	0.60	3.19		44	59	47880	
HC-12	AHU-13					55	-	74	-				2.6		180	150	30,986	
CC-13	AHU-13		42×18	6/8	2490	80.0	63.5	56	51.5	5.25	465	0.42	3.0	2.21	44	59	48487	
HC-13	AHU-13			1/8		55	-	74	-			0.07	3.34	0.73	180	150	50069	2 CIRCUITS
CC-14	AHU-13		15×12	4/8	600	80.0	63.5	70	60	1.25	480	0.44	.44	0.85	44	59	6669	
HC-14	AHU-13			1/8		55	-	74	-			0.08	.82	0.16	180	150	12312	
CC-15	AHU-13		24×15	6/8	1180	80.0	63.5	58	54.1	2.5	472	0.43	2.1	3.70	44	59	31284	3 WAY MOD. VALVE
HC-15	AHU-13			1/8		55	-	74	-			0.08	1.61	0.85	180	150	24214	
CC-16	AHU-14		21×12	6/8	820	91	67	64	57.1	1.75	469	0.43	3.29	2.70	44	59	24686	
HC-16	AHU-14			1/8		64	-	74	-			0.07	0.59	0.11	180	150	8856	
CC-17	AHU-15		18×12	6/10	630	91	67	55	52.7	1.5	420	0.54	3.69	3.09	44	59	27698	
HC-17	AHU-15			1/8		55	-	75	-			0.06	0.91	0.21	180	150	13608	
CC-18	AHU-19		18×12	6/8	735	91	67	58	54.7	1.5	490	0.46	3.78	3.23	44	59	28378	2 CIRCUITS
HC-18	AHU-19			1/8		55	-	75	-			0.08	1.06	0.26	180	150	15876	
CC-19	AHU-19		12×9	6/8	500	91	67	64	57.0	1.12	447	0.39	1.99	0.77	44	59	14918	2 CIRCUITS
HC-19	AHU-19			1/8		55	-	75	-			0.01	0.72	0.10	180	150	10800	
CC-20	AHU-19		36×15	6/10	1640	91	67	55	52.1	3.75	437	0.57	9.61	2.59	44	59	72103	
HC-20	AHU-19			1/8		55	-	80	-			0.07	2.95	3.12	180	150	44200	
CC-21	AHU-18		24×12	6/10	900	84	64.5	55	52.7	2.0	450	0.62	4.23	4.51	44	59	31752	
HC-21	AHU-18			1/10		49	-	83	-			0.09	2.2	1.16	180	150	33048	
CC-22	AHU-18		12×7	6/12	300	84	64.5	55	52.7	0.75	400	0.14	1.41	2.06	44	59	10584	
HC-22	AHU-18			1/12		49	-	80	-			0.11	0.67	0.05	180	150	10044	
CC-23	AHU-18		12×6	6/10	155	84	64.5	55	52.7	0.5	310	0.31	0.73	0.51	44	59	5468	
HC-23	AHU-18			1/8		49	-	76	-			0.04	0.5	0.03	180	162	4[illegible]3	
CC-24	AHU-18	⑤	16×9	6/10	400	83.5	64.5	55	52.7	0.74	419	0.45	1.09	1.80		59	11400	
HC-24	AHU-18			1/10		49	-	76	-			0.02	0.73	0.14	180	150	11,664	
CC-25	AHU-18		12×6	6/8	240	84	64.5	55	52.7	0.5	380	0.16	1.13	1.99	44	59	6848	
HC-25	AHU-18			1/8		64.1	-	74	-			0.09	0.5	0.03	180	150	6848	
CC-26	AHU-18		12×4	6/10	280	84	64.5	55	52.7	2.75	375	0.45	1.32	1.95	44	59	9878	
				1/8		-	-	-	-			-	-	-	-	-	-	
CC-27	AHU-18		18×9	6/8	300	84	64.5	55	52.7	1.12	438	0.48	2.31	6.25	44	59	17287	
HC-27	AHU-18			1/10		49	-	80	-			0.08	1.12	0.21	180	150	16,740	3-WAY MOD. VALVE
CC-28	AHU-18		24×15	6/10	1268	84	64.5	55	52.7	2.5	502	0.74	5.9	1020	44	59	44776	
HC-28	AHU-18			1/8		49	-	76	-			0.08	2.69	176	180	150	36596	
CC-29	AHU-18		24×12	6/10	900	84	64.5	55	52.7	2	450	0.62	4.23	4.51	44	59	31752	
HC-29	AHU-18			1/8		49	-	78	-			0.07	1.88	0.86	180	150	28188	
CC-30	AHU-18		12×9	6/10	280	84	64.5	56	52.7	0.75	373	0.45	1.32	1.95	44	59	9878	
HC-30	AHU-18			1/10		49	-	78	-			0.06	0.59	0.06	180	150	8170	
CC-31	AHU-18		12×9	6/8	260	84	64.5	55	52.7	0.75	347	0.39	1.22	1.71	44	59	9173	
HC-31	AHU-18			1/10		49	-	80	-			0.06	0.58	0.06	180	150	8705	3-WAY MOD. VALVE
CC-32	AHU-16		36×15	6/8	1600	91	67	55	53.3	3.75	430	0.47	7.11	2.5	44	59	72550	
HC-32	AHU-16			1/8		55	-	76	-			0.08	2.2	1.5	80	150	41000	
CC-33	AHU-16		21×12	4/8	800	91	67	65	59.1	1.75	457	0.41	3.09	2.41	44	59	23148	
HC-33	AHU-16			1/8		55	-	73	-			0.07	1.04	0.29	180	50	15552	
CC-34	AHU-16		21×12	6/10	855	91	67	55	52.7	1.75	489	0.69	5.01	5.69	44	59	37590	
HC-34	AHU-16			1/8		55	-	75	-			0.08	1.11	0.32	180	150	16021	
CC-35	AHU-16		21×12	6/10	855	91	67	55	52.7	1.75	489	0.69	5.01	5.69	44	59	37590	
HC-35	AHU-16			1/8		55	-	73	-			0.08	1.11	0.32	180	150	16021	
CC-36	AHU-16		24×12	6/8	900	91	67	59	55.3	2	450	0.40	4.43	4.89	44	59	33251	
HC-36	AHU-16			1/8		55	-	73	-			0.07	1.17	0.38	180	150	19490	
CC-37	AHU-8		18×12	6/12	650	91	67	54	51.9	1.5	433	0.67	4.0	3.55	44	59	29452	
HC-37	AHU-8			1/8		54	-	68	-			0.07	0.66	0.12	180	150	9828	
CC-38	AHU-8		21×12	6/8	830	91	67	58	54.5	1.75	474	0.49	4.33	4.40	44	59	32495	
HC-38	AHU-8			1/8		54	-	80	-			0.08	1.57	0.58	180	150	29606	
CC-39	AHU-1		42×15	6/8	1860	91	67	57.2	54.2	4.87	382	0.36	9.91	2.99	44	59	74326	
HC-39	AHU-1			1/8		55	-	75	-			0.06	2.68	2.90	180	150	40176	3-WAY MOD. VALVE
CC-40	AHU-1		21×12	6/8	800	91	67	57.2	54.2	1.75	457	0.41	4.26	4.27	44	59	31968	
HC-40	AHU-1			1/8		55	-	75	-			0.07	1.15	0.94	180	150	17280	
CC-41	AHU-1		21×18	6/8	1040	91	67	57.2	54.2	2.19	477	0.44	5.65	8.32	44	59	41600	
HC-41	AHU-1			1/8		55	-	75	-			0.08	1.5	0.71	180	150	22464	
CC-42	AHU-12		21×15	6/8	1020	91	67	58	54.5	2.19	466	0.42	5.32	7.96	44	59	39933	
HC-42	AHU-12			1/8		55	-	75	-			0.08	1.47	0.67	180	150	22032	
CC-43	AHU-12		42×15	6/8	2140	91	67	58	54.5	4.87	439	0.46	11.17	3.70	44	59	85781	
HC-43	AHU-12			1/8		55	-	75	-			0.08	3.08	3.71	180	150	46224	
CC-44	AHU-12		21×15	6/8	1050	91	67	58	54.5	2.19	479	0.44	5.48	8.58	44	59	41108	
HC-44	AHU-12			1/8		55	-	75	-			0.08	1.51	0.71	180	150	22680	

① TEMPERATURE CONTROL VALVES FOR CHILLED WATER COILS SHALL BE 3 WAY PNEUMATIC MODULATING TYPE, 4 PSIG MAX PRESSURE DROP.
④ TEMPERATURE CONTROL VALVES FOR HEATING HOT WATER COILS SHALL BE 2 WAY PNEUMATIC MODULATING TYPE (U.O.N. ON WATERFLOW DIAGRAM), 1 PSIG MAX PRESSURE DROP.
⑤ "PACE" TYPE CW FOR COOLING COILS & HW FOR HEATING COILS OR APPROVED EQUAL.

PRE CHARGED EXPANSION TANK SCHEDULE

TAG	SERVICE	LOCATION	GAL.	MANUFACTURER MODEL NO.	SIZE DIA × L (IN)	MAX. OPER. PRESS. PSIG	FILL PRESSURE PSIG	OPERATING WEIGHT	REMARKS	
ET-1	HEATING WATER	GRADE	44.4	B&G D-100V	16½"Ø×40¾"H	30	15	570 LBS	ASME CODED TANK CI69 PSIG	①
ET-2	CHILLED WATER	ROOF	33.6	B&G D-60V	16½"Ø×28¾"H	30	7	450 LBS	" "	②
ET-3	RECIRCULATING COOLING WATER	ROOF	10.9	B&G D-20	12"Ø×25½"L	30	7	150 LBS		

① ACCEPTANCE – 22.2 GALS. – VERTICAL TANK.
② ACCEPTANCE – 11.1 GALS. – VERTICAL TANK.
③ ACCEPTANCE – 2.5 GALS. – HORIZONTAL TANK

ABSOLUTE FILTER SCHEDULE

TAG (E)	UNIT SERVED	CFM	NO FILTERS	SIZE EACH	INIT. P.D. IN WG	EFFICIENCY	REMARKS
1	AHU-13	14200	6 2 1	24×24×12 24×24×12 12×12×12	.98	99.97%	
2	AHU-14	1445	2	24×24×12	.66	99.97%	
3	AHU-15	1905	1	30×24×11½	.66	99.97%	

SHEET NOTES:

1- FOR GENERAL NOTES SEE DRAWING M.1.1

(E) BUILDING

OK 7/19/96 KMG

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Issuances and Revisions

No.	Date	Description
2	1-25-96	ISSUED FOR CONSTRUCTION ADDENDUM 2 & 4
	2-27-96	AS BUILT

Date 7/29/91
Sheet Title

SCHEDULES

Project No. 9002

M 4.3 | 0
Sheet No. 113/178 | Revision

FUME HOOD EXHAUST FAN SCHEDULE

TAG (FH)	HOOD SERVED	MANUFACTURER & MODEL #	TYPE	CFM	SP IN WG	MIN WHEEL DIA	DISCH	OUTLET VEL. FPM	FAN RPM	MOTOR HP	MOTOR V	MOTOR PH	MOTOR HZ	UNIT WEIGHT LBS	REMARKS
1	FH-1	TWIN CITY 122 BCV	BELT DRIVEN UTILITY	1250	1½"	12½"	BAU	1453	1849	¾	460	3	60	225	TYPE A CORROSION RESISTANT CONSTRUCTION
2	FH-2	TWIN CITY 122 BCV		1250	1½"	12½"	BAU	1453	1849	¾	460	3	60	225	
3	FH3 THRU FH8	TWIN CITY 300 BCV		8400	1½"	30"	BAU	1629	769	5	460	3	60	900	
4	FH-9	TWIN CITY 105 BCV		760	1½"	10½"	BAU	1188	1998	½	460	3	60	150	
5	FH-10	TWIN CITY 122 BCV		1250	1½"	12½"	BAU	1453	1849	¾	460	3	60	225	
6	FH-11, FH-12	TWIN CITY 182 BCV		2960	1½"	18½"	BAU	1542	1049	1½	460	3	60	400	
7	FH-13	TWIN CITY 135 BCV		1710	1½"	13½"	BAU	1629	1158	1	460	3	60	285	
8	FH-14	TWIN CITY 122 BCV		1000	1½"	12½"	BAU	1163	1730	½	460	3	60	225	
9	FH-15	TWIN CITY 105 BCV		760	1½"	10½"	BAU	1188	1998	½	460	3	60	150	
10	FH-16	TWIN CITY 182 BCV		1000	1½"	12½"	BAU	1163	1720	½	460	3	60	225	
11	FH-17	TWIN CITY 122 BCV		1250	1½"	12½"	BAU	1453	1849	¾	460	3	60	225	
12	FH-18 FH-20	TWIN CITY 135 BCV		1760	1½"	13½"	BAU	1676	1782	1	460	3	60	285	
13	FH-21	TWIN CITY 122 BCV		1000	1½"	12½"	BAU	1163	1730	½	460	3	60	225	
14	FH-22	TWIN CITY 182 BCV		950	1⅝"	10½"	BAU	1188	1998	¾	460	3	60	150	
15	FH-23	TWIN CITY 122 BCV		1250	1½"	12½"	BAU	1453	1849	¾	460	3	60	225	
16	FH-24	TWIN CITY 165 BCV		2500	1½"	16½"	BAU	1592	1423	1½	460	3	60	375	

① TWIN CITY MODEL HAS USED TO ESTABLISH QUALITY. SEE SPECIFICATIONS FOR ALTERNATE MANUFACTURERS.

* FUME HOOD SCHEDULE (FOR INFORMATION ONLY)

TAG (FH)	LOCATION	SIZE LENGTH FEET	TYPE	EXHAUST CFM	PRESS. DROP IN WG.	MAKE UP AIR CFM	REMARKS
1	HAZ. MAT.	6 FT	AUXILIARY AIR	1250	.375	625	FEF - 1
2	CLSA	6 FT	AUXILIARY AIR	1250		600	FEF - 2
3	SAMPLE. CON. & CLEAN	6 FT	AUXILIARY AIR	1250		875	FEF - 3
4	SAMPLE. CON & CLEAN	8 FT		1710		1200	
5	EXTRACTION	6 FT		1250		875	
6		6 FT		1250		875	
7		6 FT		1250		875	
8		8 FT		1710		1200	
9	LIQUID INSTRUMT	4 FT	BYPASS	760		—	FEF - 4
10	V.O.A	6 FT	AUXILIARY AIR	1250		875	FEF - 5
11	GC	6 FT	BYPASS	1250		—	FEF - 6
12	LC. MS.	8 FT		1710		—	FEF - 6
13	GLASS WASH	8 FT	AUXILIARY AIR	1710		1200	FEF - 7
14	SAMPLE & RECEIVING	5 FT	BYPASS	1000		—	FEF - 8
15	MICROBIO.	4 FT		760		—	FEF - 9
16	CLEAN ROOM	5 FT		1000		—	FEF - 10
17	MICROSCOPY	6 FT		1250		—	FEF - 11
18	PREP. LAB	5 FT	AUXILIARY AIR	1000		700	FEF - 12
19	PREP LAB	5FT	PERCHLORIC ACID	1000		—	SCRUBBER, SEE DETAIL
20	INSTRUMENT	4 FT	BYPASS	760		—	FEF - 12
21	I.C.P.	5 FT	BYPASS	1000		—	FEF - 13
22	RADIOLOGY	4 FT	BYPASS	960		—	FEF - 14 WITH CARBON FILTER
23	INORG. LAB	6 FT	BYPASS	1250		—	FEF - 15 AC - DIGESTION
24	INORG. LAB	12 FT	BYPASS	2500		—	FEF - 16

* SEE ARCHITECTURAL SPECIFICATIONS.

* CANOPY HOODS (FOR INFORMATION ONLY)

TAG (CH)	LOCATION	SIZE	CFM	REMARKS
1	OVEN ROOM	25'6 x 4' DP	1750	EF-3
2	GLASS WASH	25'6 x 4' DP	1750 /	EF-3
3	INORGANIC CHEM.	12'6 x 3' DP	2000	EF-6
4	INORGANIC CHEM.	12'6 x 3' DP	2000	EF-7
5	MEDIA KITCHEN	13'6 x 4' DP	2000	EF-9
6	PREP. LAB	6'6 x 2'6" DP	600	EF-13
7	SPECT.	25'-6 x 4' DP	600	EF-3

* SEE ARCHITECTURAL DRAWINGS

REHEAT COIL SCHEDULE

TAG (RH)	EXIST. DESIGNATION	SYSTEM	MANUFACTURER & MODEL #	SIZE	ING ROWS / FPI	CFM	AIR TEMP °F ENT °F	AIR TEMP °F LVG °F	TOTAL FACE AREA S.F.	FACE VEL. F.P.M.	MAX F.P IN. WG	① WATER GPM	WATER PD	WATER ENT °F	WATER LVG °F	TOTAL CAPACITY BTUH.	REMARKS
1	HC-19	AHU-3	EXISTING	30 - 14	1/8	4160	63.5	80	2.9	1128	0.02	0.65	0.2	180	160	6800	② REPLACE (E) TCV VALVE
2	HC-18	AHU-3	EXISTING	24 x 12	1/8	810	63.5	80	2.0	405	0.06	1.44	0.54	180	160	14484	②
3	—	AHU-3		21 x 12	1/8	880	63.5	80	1.75	474	0.08	1.5	0.55	180	160	14791	②
4	—	AHU-3		42 x 15	1/8	1990	63.5	85	4.81	409	0.01	4.62	0.13	180	160	46201	②
5	HC-15	AHU-10	EXISTING	45 x 18	1/8	3360	65	82	5.63	597	0.11	6.71	2.25	180	160	61640	② REPLACE (E) TCV VALVE
6	HC-16	AHU-10	EXISTING	12 x 12	1/8	400	65	82	1.0	400	0.06	0.73	0.12	180	160	7344	②
7	HC-17	AHU-10	EXISTING	12 x 12	1/8	400	65	82	1.0	400	0.06	0.73	0.12	180	160	7344	②
8	—	AHU-6		18 x 9	1/8	580	65	80	1.12	518	0.09	0.94	0.16	180	160	9596	②
9	—	AHU-6		42 x 18	1/8	3220	65	80	6.0	538	0.12	5.23	1.60	180	160	52326	②
10	—	AHU-6		18 x 12	1/8	810	65	80	1.5	540	0.10	1.31	0.40	180	160	13122	②

① HWS & HWR FROM EXISTING SYSTEM.
② ALL TEMPERATURE CONTROL VALVES SHALL BE 2 WAY PNEUMATIC MODULATING TYPE (U.O.N. ON WATER FLOW DIAGRAM 1 PSIG MAX. PRESS. DROP.

DAMPER SCHEDULE

SYST. NO	RET. AIR FAN	DAMPER AIR QUANTITY - CFM OSA MIN.	OSA MAX.	RET. AIR MIN.	RET. AIR MAX.	EXHAUST AIR MIN.	EXHAUST AIR MAX.
AHU-3	RF-1	780	4820	0	3540	290	3830
AHU-4	RF-2	390	2590	0	2200	50	2250
AHU-5	RF-3	660	4410	0	3750	0	3750
AHU-6	RF-4	560	4620	0	4060	0	4060
AHU-7	RF-5	600	3520	0	2920	0	2420
AHU-9	RF-8	250	2480	0	2240	0	2240
AHU-10	RF-9	500	4160	0	3660	0	3660
AHU-17	RF-6	2235	4305	0	2070	0	2070
AHU-18	RF-7	2900	5160	0	2260	0	2260

- OSA DAMPERS SIZE TO MATCH LOUVERS (U.O.N)
- SIZE RETURN AIR & EXHAUST AIR DAMPERS FOR 1000 FPM (GROSS AREA)

MISCELLANEOUS EQUIPMENT SCHEDULE

FIRE SCRUBBER S-1 : DURALL INDUSTRIES MODEL FW 300. CEILCOTE OR APPROVED EQUAL, FACTORY ASSEMBLED. VERTICAL COUNTER FLOW, PVC CONSTRUCTED, PACKED TOWER UNIT WITH BUILT IN FAN, SELF CONTAINED RECIRCULATION SYSTEM, FLANGED INLET & OUTLET.
FAN TYPE MH, 13000 CFM AT 12½"ϕ WHEEL, 4" TOTAL S.P, TEFC 5HP MOTOR - 2HP/460V/3ϕ/60HZ EQUIPPED WITH A PLASTISOL COATED WHEEL, BELT DRIVEN.

SCRUBBER SHALL RECIRCULATE 35 GPM THRU SPRAY NOZZLES WITH 5% MAKE UP PROVIDE SELF-CONTAINED 22.9 GAL. RECIRCULATION TANK & RECIRCULATION PUMP WITH ¾ HP TYP-SS, 3600 RPM MOTOR 460 V/3ϕ/60 HZ UNIT OPER. WEIGHT - 759 LBS

TEMPERATURE CONTROL AIR COMPRESSOR TCC-1: : HONEYWELL, JOHNSON SERVICE OR APPROVED EQUAL, DUPLEX TANK MOUNTED AIR COMPRESSOR COMPLETE WITH FACTORY MOUNTED PREWIRED PANEL INCLUDING STARTERS, PRESSURE SWITCHES, ALTERNATORS, DISCONNECTS, ETC., UL. LABELED 2 - ¾ HP, 460 V, 3ϕ, 60 HZ MOTORS, 30 GAL. ON HORIZONTAL ASME TANK

EXISTING HP-2 HEAT PUMP TRANE WCHO 60A: REBALANCE FOR 1000 CFM AT .15" SP.

EXISTING EXH. FAN, EF-23 AEROVENT MODEL 21G12CVB CENTRIFUGAL ROOF EXHAUSTER ¾ HP, 460V, 3ϕ MOTOR, WITH VARIABLE SPEED DRIVE.

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Issuances and Revisions

No.	Date	Description
1	1-25-96	ISSUED FOR CONSTRUCTION ADDENDUM 2 & 3
	2-29-96	AS BUILT PER PYL

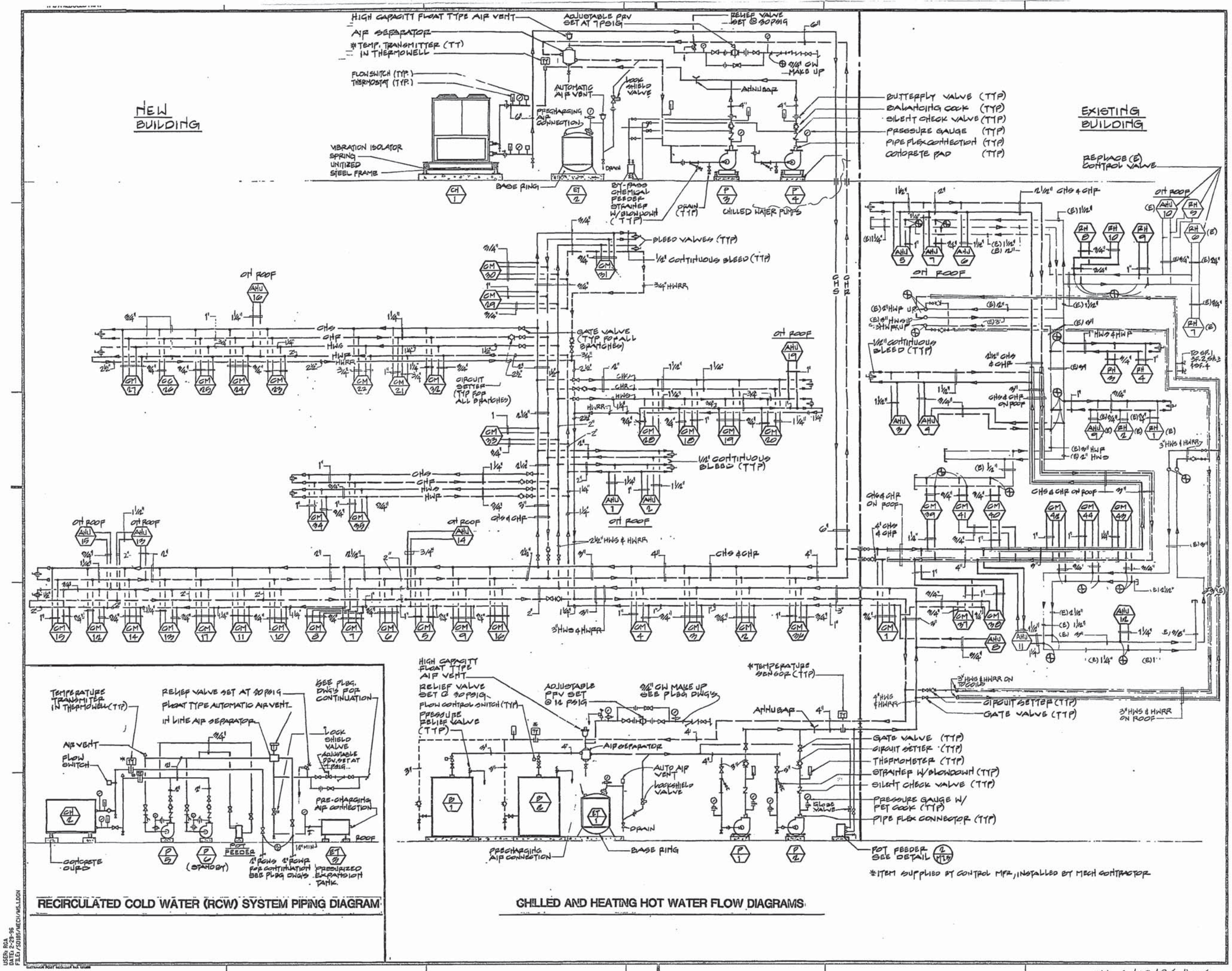
Date 7/29/91

Sheet Title
SCHEDULES

Project No. 9002

M 44 | 0
Sheet No. 114/178 | Revision

9/19/96



RECIRCULATED COLD WATER (RCW) SYSTEM PIPING DIAGRAM

*ITEM SUPPLIED BY CONTROL MFR, INSTALLED BY MECH CONTRACTOR

CHILLED AND HEATING HOT WATER FLOW DIAGRAMS

USER: RCA
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Issuances and Revisions

No.	Date	Description
1	1.25.92	ISSUED FOR CONSTRUCTION ADDENDUM 4
	2-29-96	AS BUILT MOD. PYL

Date: 7/19/91

Sheet Title

FLOW DIAGRAMS

Project No. 9002

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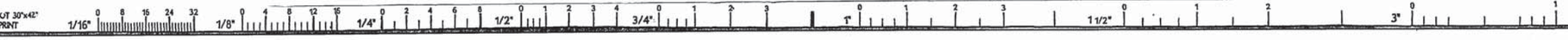
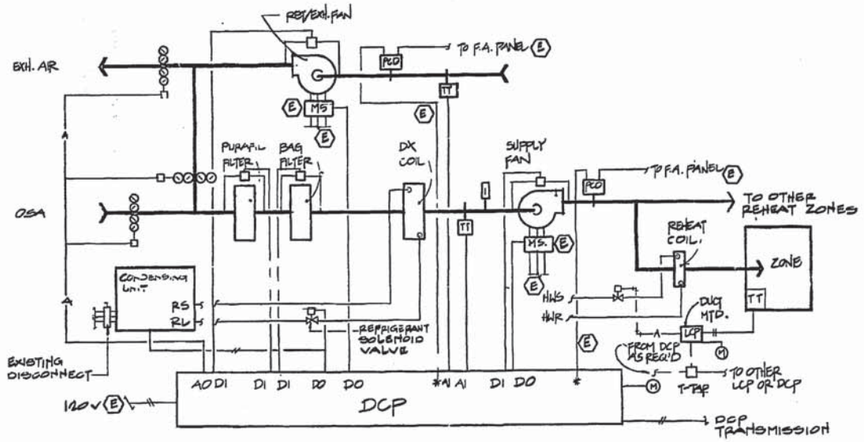
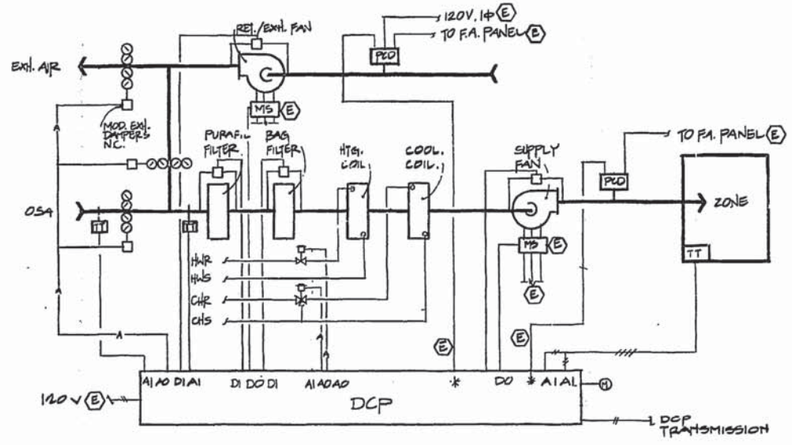




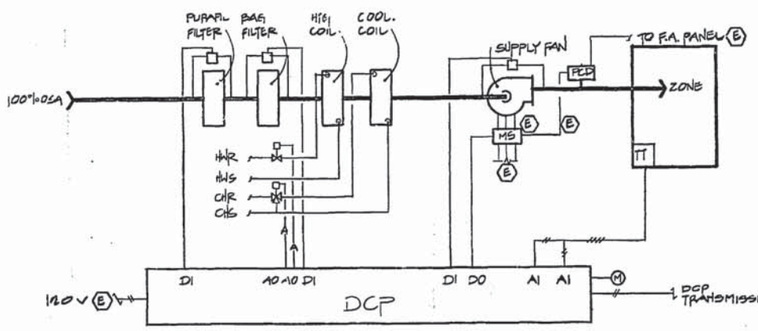
1 M6.1 **AIR FLOW & TEMPERATURE CONTROL DIAGRAM**

NOT TO SCALE — TYP. FOR AHU- 10



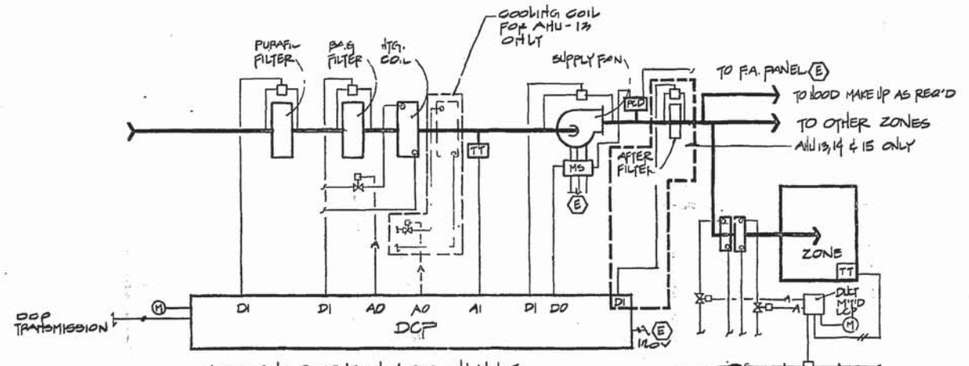
2 M6.1 **AIR FLOW & TEMPERATURE CONTROL DIAGRAM**

NOT TO SCALE — TYP. FOR AHU- 4, 5, 7



3 M6.1 **AIR FLOW & TEMPERATURE CONTROL DIAGRAM**

NOT TO SCALE! — TYP. FOR AHU- 2, 11



NOTE: SINGLE ZONE ONLY FOR AHU 14 & 15

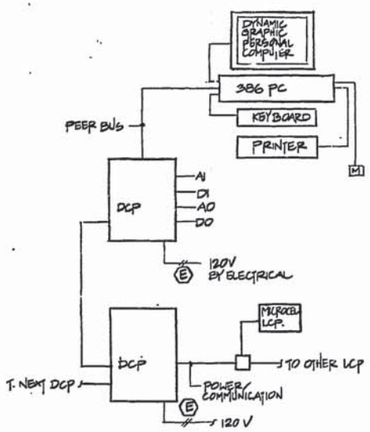
4 M6.1 **AIR FLOW & TEMPERATURE CONTROL DIAGRAM**

NOT TO SCALE

TYP. FOR AHU-13, 14, 15
AHU-1, 8, 12, 16, 19 SIMILAR EXCEPT NO AFTER FILTER

5 M6.1 **AIR FLOW & TEMPERATURE CONTROL DIAGRAM**

NOT TO SCALE. — TYP. FOR AHU-17, 18



6 M6.1 **BMS GRAPHIC CENTRAL ARCHITECTURE FOR CONTROLS**

NOT TO SCALE

- (M) CONTROL AIR SUPPLY
- (E) UNDER ELECTRICAL WORK, ALL OTHER WIRING UNDER MECH.
- * SUPPLY FAN SMOKE DETECTOR SHALL SHUT DOWN BOTH SUPPLY & RETURN FANS ON ALARM. RETURN FAN SMOKE DETECTOR SHALL OPEN OA, EA DAMPER AND CLOSE THE RETURN AIR DAMPER.
- CLEAP 405 — DIFFERENTIAL PRESSURE AIR FLOW SWITCH
- TCV, DA — VSOI WITH MP 953 — PNEUMATIC MODULATING CONTROL VALVE
- TT — T 7006 — DUCT TEMPERATURE SENSOR
- TT — T 7515D — ROOM TEMPERATURE SENSOR WITH PUSH BUTTON, LED, AND SETPOINT ADJUSTMENT.
- D6415D — SMOKE CONTROL DAMPER FOR OA, RA, EA DAMPERS
- MP 918 — PNEUMATIC DAMPER ACTUATOR
- DSD — DUCT SMOKE DETECTOR, 120V
- MS — MOTOR STARTER BY ELECTRICAL. SEE M5.1 FOR OTHER CONTROL DEVICES.
- DCP — DIGITAL CONTROL PANEL
- LCP — LOCAL CONTROL PANEL
- CONTROL AIR
- F.A. — FIRE ALARM PANEL

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Issuances and Revisions

No.	Date	Description
1	1-25-96	ISSUED FOR CONSTRUCTION ADDENDUM 2.
	2-29-96	AS BUILT MOD. PYL

Date 7/29/91

Sheet Title

CONTROL DIAGRAMS

Project No. 9002

M 6.1 — Sheet No. 16/18 — 0 — Revision

RGA 9/19/96

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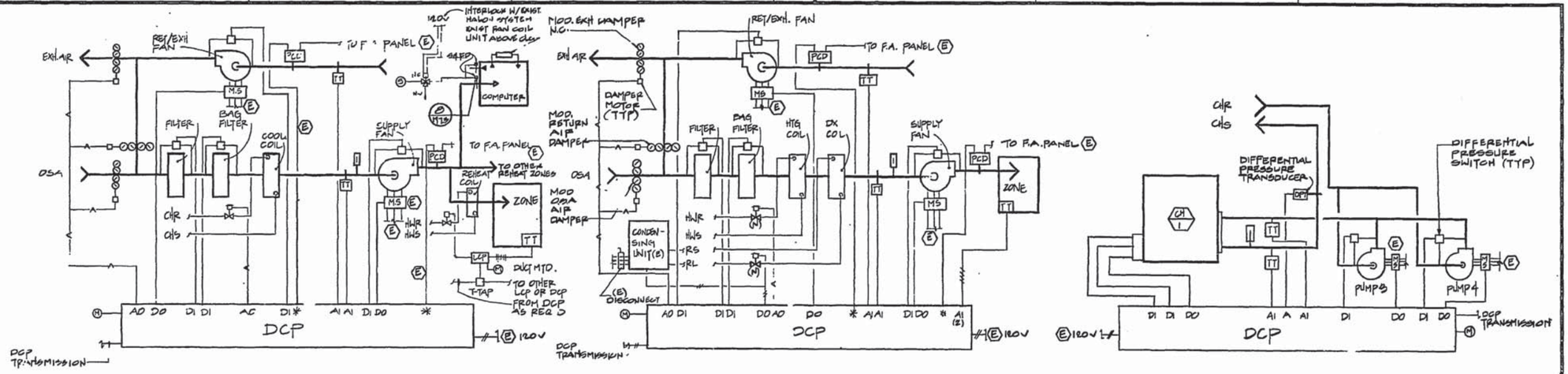
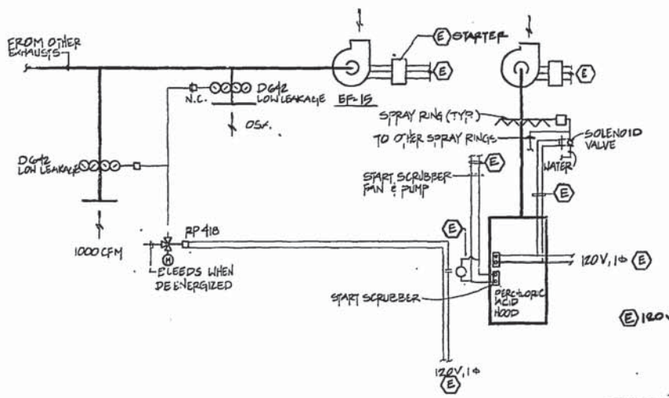


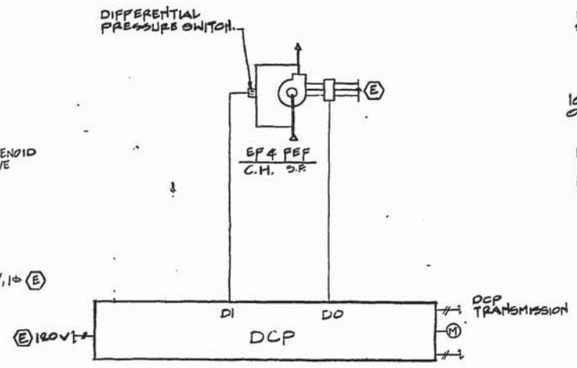
1 M6.2 **AIRFLOW & TEMPERATURE CONTROL DIAGRAM**
TYP. FOR AHU- 3, 6

2 M6.2 **AIRFLOW & TEMPERATURE CONTROL DIAGRAM**
TYP. FOR AHU- 9

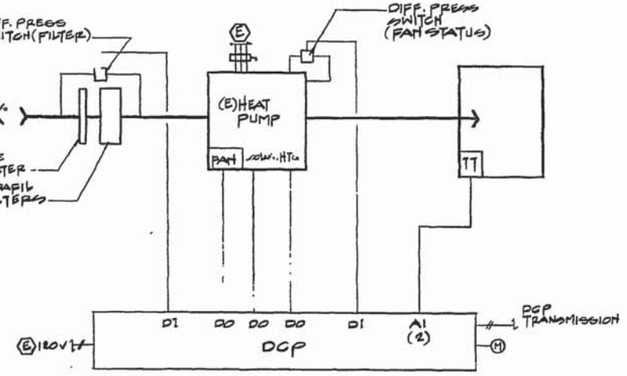
4 M6.2 **CHILLED WATER TEMPERATURE CONTROL DIAGRAM**
FOR CH-1 SIMILAR FOR CH-2



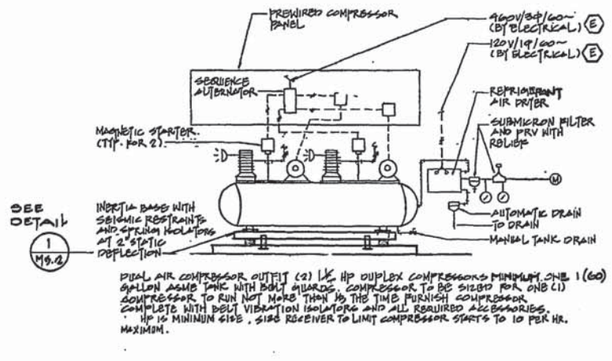
4 M6.2 **DAMPER CONTROL FOR EF-15 SYSTEM**



5 M6.2 **EXHAUST FAN CONTROL DIAGRAM**
STATUS ONLY FOR FEF AND C.H. FANS AND EXISTING SF-1 SF-2 & SF-4

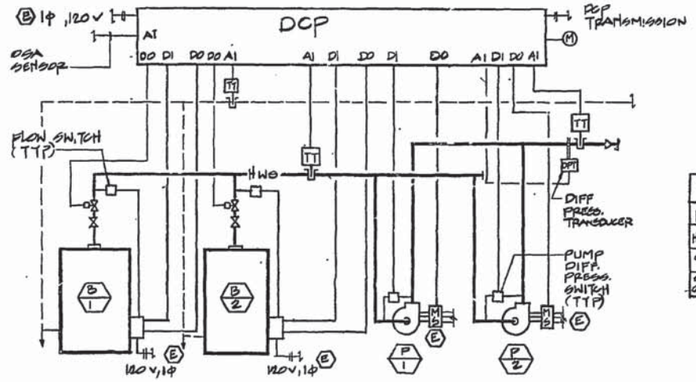


6 M6.2 **AIR FLOW AND TEMPERATURE CONTROL DIAGRAM**
EXIST. HEAT PUMP HP-2

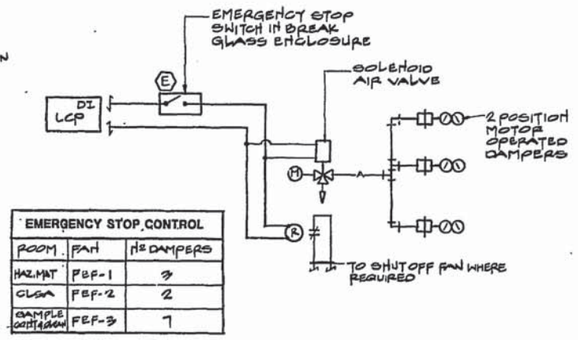


DUAL AIR COMPRESSOR OUTFIT (2) 1½ HP DUPLEX COMPRESSORS MINIMUM, ONE 1 (60) GALLON ASME TANK WITH BOLT HOLDS. COMPRESSOR TO BE SIZED FOR ONE (1) COMPRESSOR TO RUN NOT MORE THAN 10 THE TIME DURNISH COMPRESSOR COMPLETE WITH BELT VIBRATION ISOLATORS AND ALL REQUIRED ACCESSORIES. HP IS MINIMUM 6 CFM. SIZE RECEIVER TO LIMIT COMPRESSOR STARTS TO 10 PER HR. MAXIMUM.

7 M6.2 **TEMPERATURE CONTROL AIR COMPRESSOR**



8 M6.2 **HOT WATER TEMPERATURE CONTROL DIAGRAM**



EMERGENCY STOP CONTROL		
ROOM	FAN	NO. DAMPERS
HAZ. MAT	FEF-1	3
CLSA	FEF-2	2
SAMPLE CONTAINER	FEF-3	1

9 M6.2 **EMERGENCY STOP CONTROL**

USER: RCA
DATED: 3-4-96
FILE: /SD185/MECH/M6.2.DGN

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Oakland, CA

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EBMUD PROJECT MGR.
R.P.E. NO. C 31966
EBMUD MGR. OF SUPPORT SERVICES
R.P.E. NO. C 33317
EBMUD MGR. OF WASTEWATER
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Issuances and Revisions

No.	Date	Description
1	1-25-96	ISSUED FOR CONSTRUCTION ADDENDUM 4 & 5
	3-4-96	AS BUILT

Date 7/09/91

Sheet Title

CONTROL DIAGRAMS

Project No. 9002

M 6.2 | 0
Sheet No. 117/178 | Revision

OK 9/19/96 BRUCE

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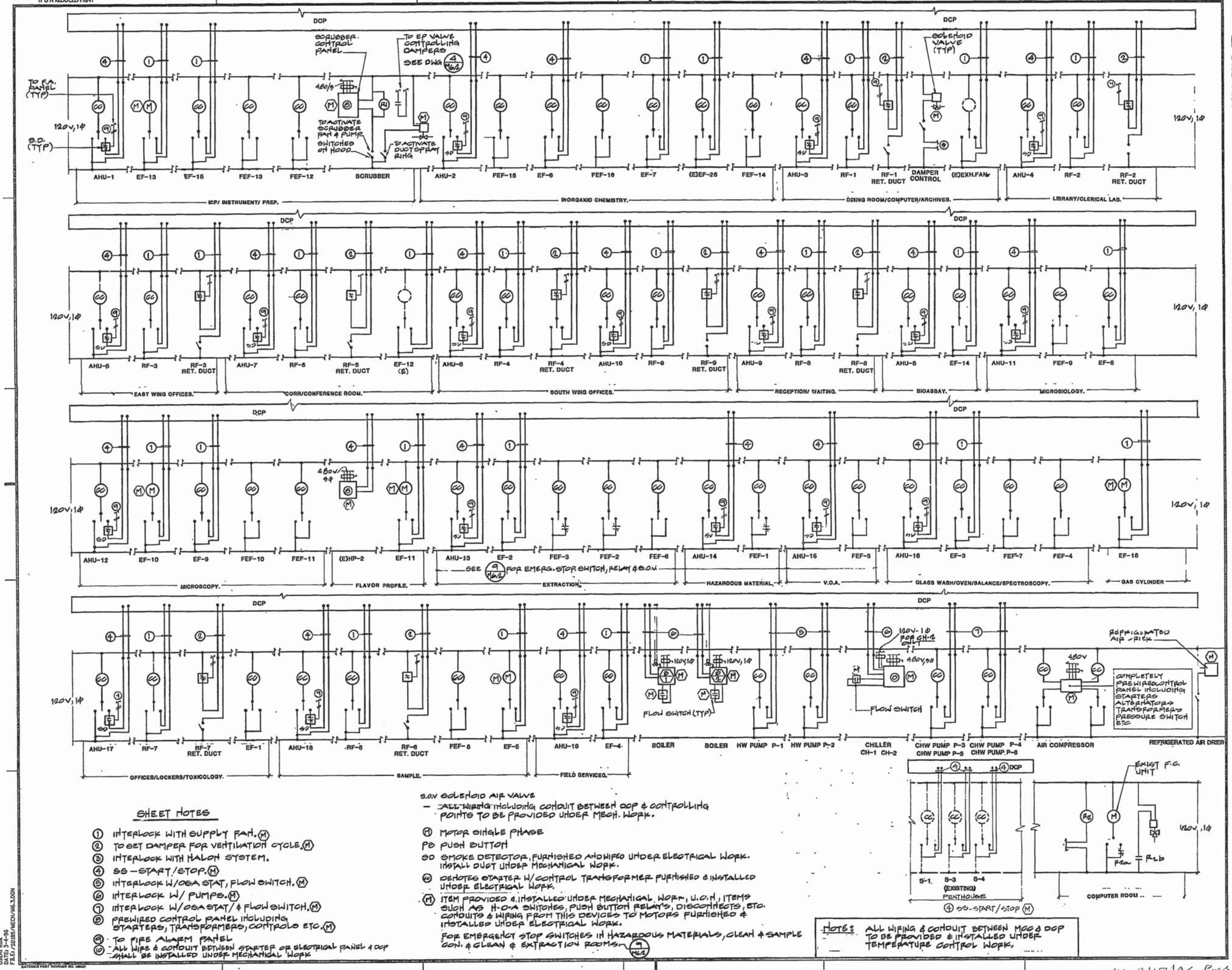

SHEET NOTES

1. INTERLOCK WITH SUPPLY FAN. (M)
2. TO SET DAMPER FOR VENTILATION CYCLE. (M)
3. INTERLOCK WITH HALON SYSTEM.
4. SS – START/STOP. (M)
5. INTERLOCK W/ OSA STAT, FLOW SWITCH. (M)
6. INTERLOCK W/ PUMPS. (M)
7. INTERLOCK W/ OSA STAT/ & FLOW SWITCH. (M)
8. PREWIRED CONTROL PANEL INCLUDING STARTERS, TRANSFORMERS, CONTROLS ETC. (M)
9. TO FIRE ALARM PANEL
10. ALL WIRE & CONDUIT BETWEEN STARTER OR ELECTRICAL PANEL & DCP SHALL BE INSTALLED UNDER MECHANICAL WORK

S.O.V SOLENOID AIR VALVE
– ALL WIRING INCLUDING CONDUIT BETWEEN DCP & CONTROLLING POINTS TO BE PROVIDED UNDER MECH. WORK.

(M) MOTOR SINGLE PHASE
PB PUSH BUTTON
SD SMOKE DETECTOR, FURNISHED AND WIRED UNDER ELECTRICAL WORK. INSTALL DUCT UNDER MECHANICAL WORK.
(S) DENOTES STARTER W/ CONTROL TRANSFORMER FURNISHED & INSTALLED UNDER ELECTRICAL WORK.
(M) ITEM PROVIDED & INSTALLED UNDER MECHANICAL WORK, U.O.N., ITEMS SUCH AS H-O-A SWITCHES, PUSH BUTTON RELAY'S, DISCONNECTS, ETC. CONDUITS & WIRING FROM THIS DEVICES TO MOTORS FURNISHED & INSTALLED UNDER ELECTRICAL WORK.
FOR EMERGENCY STOP SWITCHES IN HAZARDOUS MATERIALS, CLEAN & SAMPLE GEN. & CLEAN & EXTRACTION ROOMS. 9 M6.2

NOTE: ALL WIRING & CONDUIT BETWEEN MCC & DCP TO BE PROVIDED & INSTALLED UNDER TEMPERATURE CONTROL WORK.

USER: RGA
DATED: 3-4-96
FILE: /SD185/MECH/M6.3.DGN

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No.	Date	Description
1	1-29-92	ISSUED FOR CONSTRUCTION ADDENDUM 4 & 5
	3-4-96	AS BUILT AS BUILT SD-185 BID PHASE

Date 7/29/91

Sheet Title
ELECTRIC INTERLOCK DIAGRAM

Project No. 9002

M6.3 | 0
Sheet No. 118/118 | Revision

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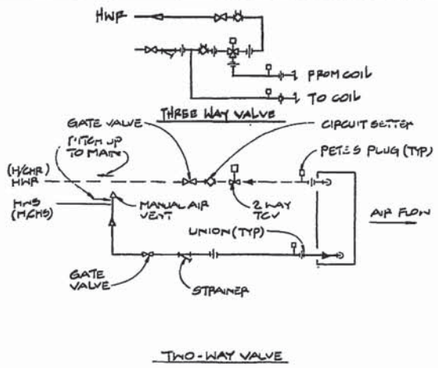
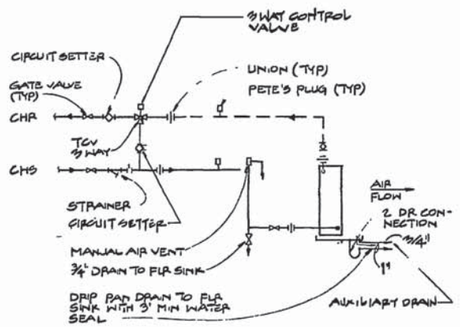
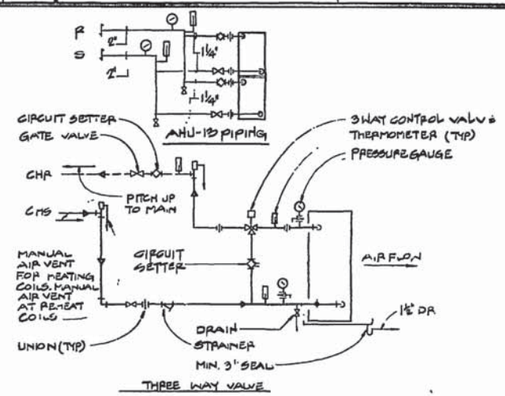
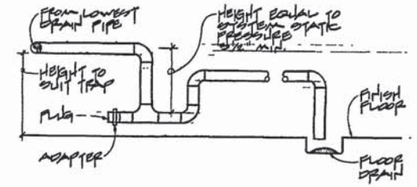


TWO-WAY VALVE





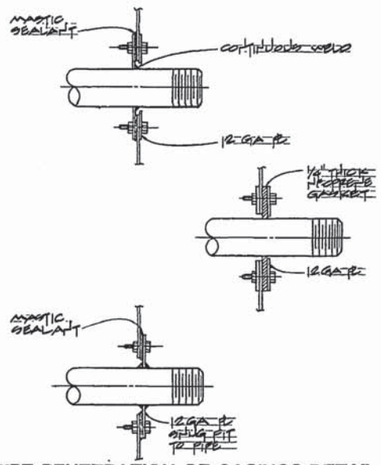


1 M7.1 REHEAT COIL PIPING DIAGRAM
(TYPICAL FOR FAN COIL UNITS- H/CHS & H/CHR)

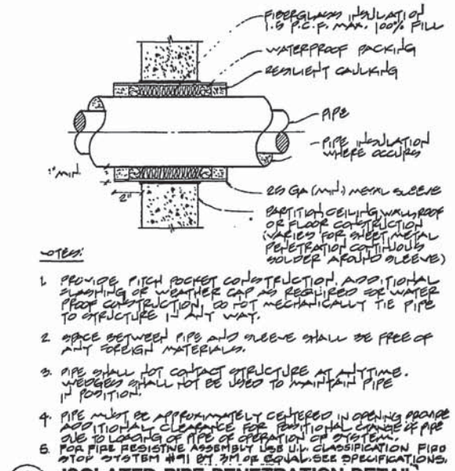
2 M7.1 CHILLED WATER COIL PIPING DIAGRAM
AT COIL MODULES

3 M7.1 COOLING COIL PIPING DIAGRAM
AT AHU UNITS

4 M7.1 COOLING COIL TRAP DETAIL



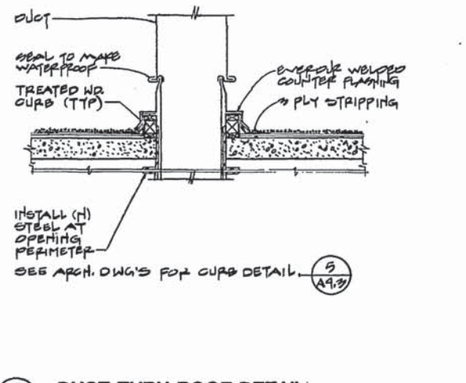
5 M7.1 PIPE PENETRATION OF CASINGS DETAIL



NOTES:

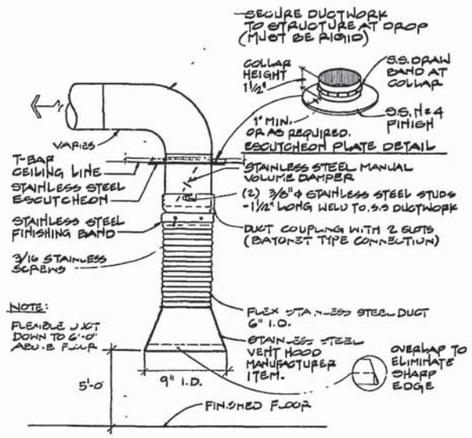
1. PROVIDE PITCH POCKET CONSTRUCTION, ADDITIONAL FLASHING OF WEATHER CAP AS REQUIRED SEE WATER PROOF CONSTRUCTION, DO NOT MECHANICALLY TIE PIPE TO STRUCTURE IN ANY WAY.
2. SPACE BETWEEN PIPE AND SLEEVE SHALL BE FREE OF ANY FOREIGN MATERIALS.
3. PIPE SHALL NOT CONTACT STRUCTURE AT ANYTIME. WEDGES SHALL NOT BE USED TO MAINTAIN PIPE IN POSITION.
4. PIPE MUST BE APPROXIMATELY CENTERED IN OPENING PROVIDE ADDITIONAL CLEARANCE FOR POSITIONAL CHANGE IF PIPE DUE TO LOCATION OF PIPE OR OPERATION OF SYSTEM.
5. FOR FIRE RESISTIVE ASSEMBLY USE U.L. CLASSIFICATION F100 STOP SYSTEM #91 BY 3M OR EQUAL. SEE SPECIFICATIONS.

6 M7.1 ISOLATED PIPE PENETRATION DETAIL

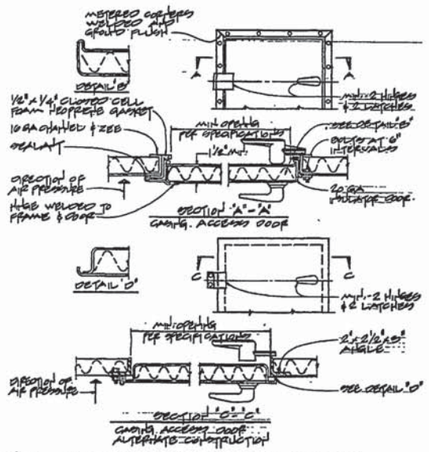


SEE ARCH. DWG'S FOR CURB DETAIL. (5 A9.3)

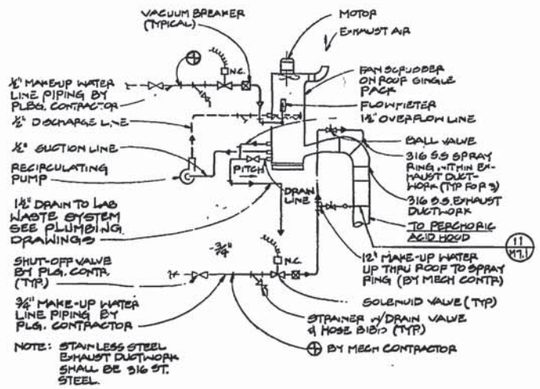
7 M7.1 DUCT THRU ROOF DETAIL



8 M7.1 ELEPHANT TRUNK DETAIL

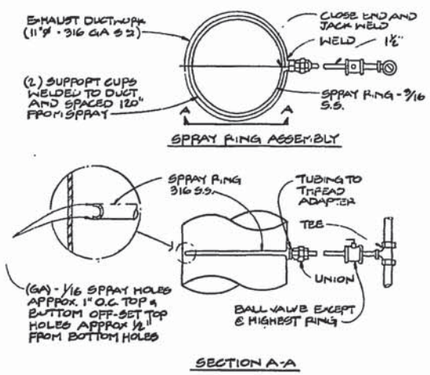


9 M7.1 CASING ACCESS DOOR DETAIL

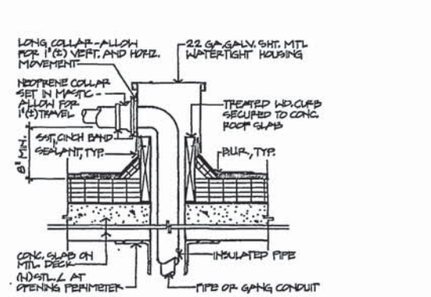


NOTE: STAINLESS STEEL EXHAUST DUCTWORK SHALL BE 316 ST. STEEL.

10 M7.1 PERCHLORIC ACID FUME SCRUBBER PIPING SCHEMATIC DETAIL



11 M7.1 SPRAY RING DETAIL



12 M7.1 PIPE ROOF PENETRATION

NOT TO SCALE

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No.	Date	Description
1	1-29-92	ISSUED FOR CONSTRUCTION
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Sheet Title

DETAILS

Project No. 9002

M.7.1 | 0

Sheet No. 119/178 | Revision

GLS 9/19/96 Revised

USER: RGA
DATE: 3-4-96
FILE: /SDI85/MECH/M7-1.DGN

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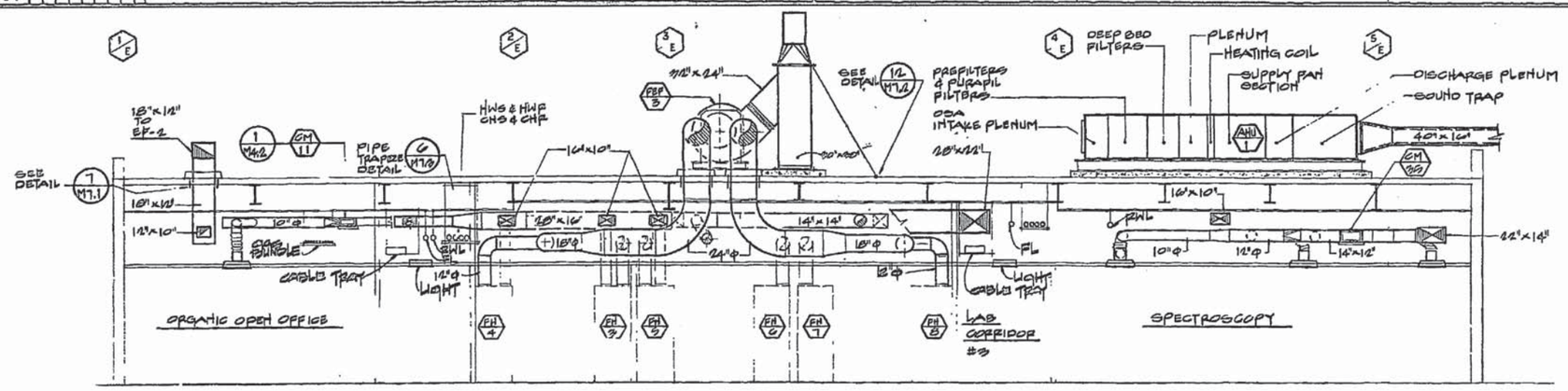

SECTION

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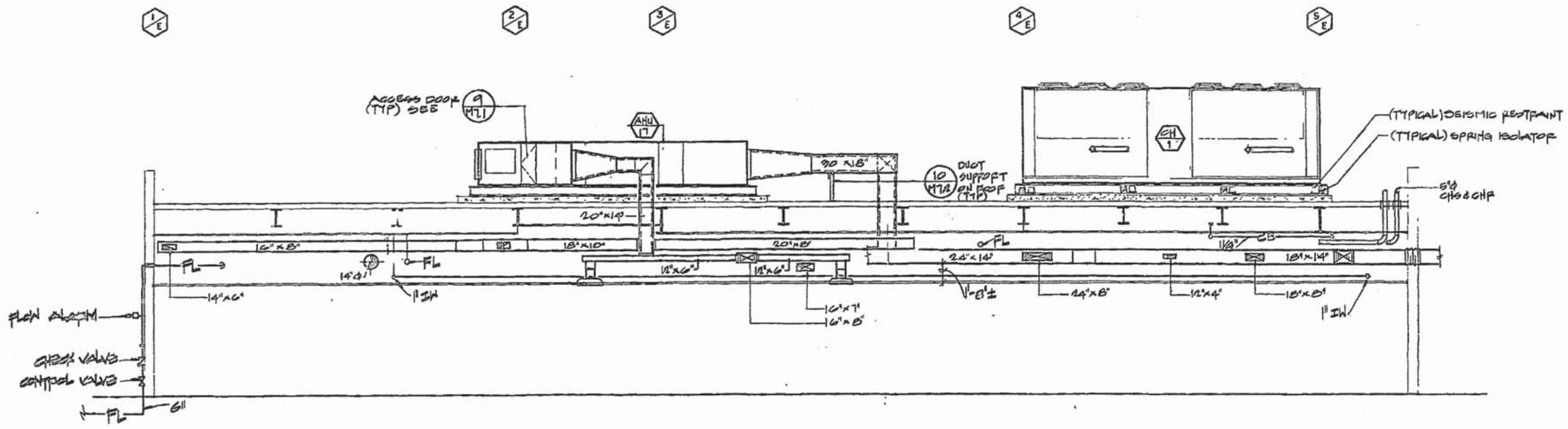
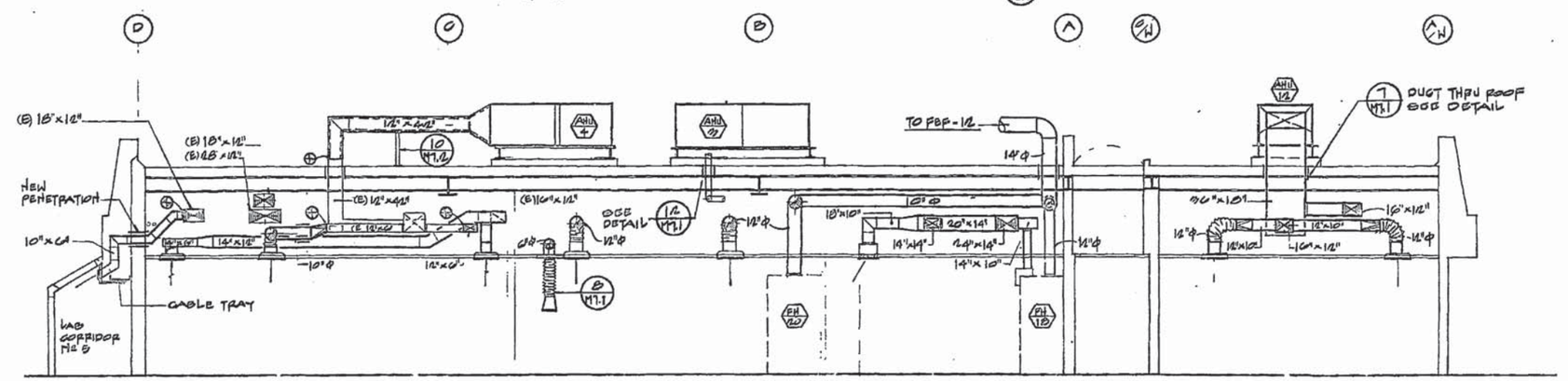
A M2.1



SECTION

1/4" = 1'-0"

B M2.1



SECTION

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No.	Date	Description
1	1.25.92	ISSUED FOR CONSTRUCTION
	3-5-96	AS BUILT

Date 7/29/91

Sheet Title

BUILDING SECTIONS

1/4" = 1'-0"

Project No. 9002

M 8.1 | 0

Sheet No. 122/178 | Revision

EAST BAY MUNICIPAL UTILITY DISTRICT

SPECIAL DISTRICT NO. 1

Oakland, California

EBMUD

CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

SD-266

May 2006

Volume 2 Drawings

Recommended _____

Edward H. McCormick
Mgr. of Support Services
R.P.E. No. C 33317

Approved _____

David R. Williams
Director of Wastewater
R.P.E. No. C 25942

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-	-----	COVER SHEET
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3	SD266-G-003	ABBREVIATIONS FOR WASTEWATER FACILITIES, A THRU M
4	SD266-G-004	ABBREVIATIONS FOR WASTEWATER FACILITIES, N THRU Z
5	SD266-G-005	LEGEND AND SECTION, DETAIL, ELEVATION AND PHOTO DESIGNATIONS
6	SD266-G-006	EQUIPMENT TAG AREA CODES
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59	W25.00-M-201	BUILDING SECTION A
60	W25.00-M-202	BUILDING SECTION B
61	W25.00-M-203	SECTIONS AND DETAILS 1
62	W25.00-M-003	HVAC SECOND FLOOR PLAN
63	W25.00-M-004	HVAC ROOF PLAN
64	W25.00-M-850	HVAC SECTIONS AND DETAILS 1
65	W25.00-M-851	HVAC SECTIONS AND DETAILS 2

INDEX OF DRAWINGS (CONTINUED)

SHEET NO.	DRAWING NO.	DRAWING TITLE
	MECHANICAL (CONTINUED)	
	W30 ----------	**WAS THICKENING STATION**
66	W30.00-M-000.D	DEMOLITION - FOUL AIR SYSTEM FLOW SCHEMATIC
67	W30.00-M-001.D	DEMOLITION - VENTILATION SYSTEM FLOW SCHEMATIC
68	W30.00-M-002.D	DEMOLITION - HVAC FIRST FLOOR PLAN
69	W30.00-M-003.D	DEMOLITION - HVAC SECOND FLOOR PLAN
70	W30.00-M-000	FOUL AIR SYSTEM FLOW SCHEMATIC
71	W30.00-M-001	VENTILATION SYSTEM FLOW SCHEMATIC
72	W30.00-M-102	FIRST FLOOR PLAN
73	W30.00-M-201	GRAVITY BELT THICKENER SPRAY NOZZLE PLAN, SECTIONS AND DETAILS
74	W30.00-M-002	HVAC FIRST FLOOR PLAN
75	W30.00-M-003	HVAC SECOND FLOOR PLAN
76	W30.00-M-004	HVAC ROOF PLAN
77	W30.00-M-851	HVAC SECTIONS AND DETAILS 1
78	W30.00-M-852	HVAC SECTIONS AND DETAILS 2
79	W30.10-M-105.D	DEMOLITION - ALLEY AND SCRUBBER PLAN
80	W30.10-M-105.1D	DEMOLITION - SCRUBBER PLAN
81	W30.10-M-250.D	DEMOLITION - HVAC SCRUBBER SECTIONS
82	W30.10-M-251.D	DEMOLITION - HVAC SECTIONS AND DETAILS 1
83	W30.10-M-105	ALLEY AND SCRUBBER PLAN
84	W30.10-M-105.1	SCRUBBER PLAN
85	W30.10-M-202	SECTIONS AND DETAILS 1
86	W30.10-M-250	HVAC SCRUBBER SECTIONS
	ELECTRICAL	
87	SD266-E-001	LEGENDS, ABBREVIATIONS AND NOTES
88	SD266-E-901	TYPICAL DETAILS 1
	W24 ----------	**PRIMARY SEDIMENTATION TANKS**
89	W24.00-E-201.D	DEMOLITION - SECTIONS AND DETAILS 1
90	W24.00-E-101	PARTIAL POWER PLAN
	W25 ----------	**SLUDGE DEWATERING BUILDING**
91	W25.00-E-102.D	DEMOLITION - FIRST FLOOR PLAN
92	W25.00-E-103.D	DEMOLITION - SECOND FLOOR PLAN
93	W25.00-E-104.D	DEMOLITION - ROOF PLAN
94	W25.00-E-102	FIRST FLOOR PLAN
95	W25.00-E-103	SECOND FLOOR PLAN
96	W25.00-E-120	CONDUIT SCHEDULE
97	W25.00-E-201	480 VOLT POWER DISTRIBUTION SINGLE LINE DIAGRAM - MCC-23A
98	W25.00-E-202	480 VOLT POWER DISTRIBUTION SINGLE LINE DIAGRAM - MCC-23B
99	W25.00-E-203	480 VOLT POWER DISTRIBUTION SINGLE LINE DIAGRAM - MCC-23C (FRONT)
100	W25.00-E-204	480 VOLT POWER DISTRIBUTION SINGLE LINE DIAGRAM - MCC-DW (FRONT)
101	W25.00-E-205	480 VOLT POWER DISTRIBUTION SINGLE LINE DIAGRAM - MCC-DW (REAR)
102	W25.00-E-220	MCC-23A AND MCC-23B ELEVATIONS
103	W25.00-E-221	MCC-23C ELEVATION (FRONT)
104	W25.00-E-222	MCC-DW ELEVATIONS
105	W25.00-E-301	CAKE PUMP CONTROL SCHEMATICS
106	W25.00-E-510	DIGITAL INPUT WIRING DIAGRAM 1
107	W25.00-E-560	CAKE PUMP CONTROL SYSTEM NETWORK DIAGRAM
	W30 ----------	**WAS THICKENING STATION**
108	W30.00-E-102.D	DEMOLITION - FIRST FLOOR PLAN - LIGHTING AND POWER
109	W30.00-E-103.D	DEMOLITION - SECOND FLOOR PLAN - LIGHTING AND POWER
110	W30.00-E-102	FIRST FLOOR PLAN - LIGHTING AND POWER
111	W30.00-E-103	SECOND FLOOR PLAN - LIGHTING AND POWER
112	W30.00-E-104	ROOF PLAN POWER
113	W30.00-E-301	SCRUBBER CONTROL SCHEMATIC
114	W30.10-E-105.1D	DEMOLITION - SCRUBBER PLAN
115	W30.10-E-105	ALLEY AND SCRUBBER PLAN
	INSTRUMENTATION	
116	SD266-I-001	LEGENDS, SYMBOLS AND ABBREVIATIONS
	W25 ----------	**SLUDGE DEWATERING BUILDING**
117	W25.00-I-111	DEWATERING CENTRIFUGE SYSTEM NO. 1 - P&ID 2
118	W25.00-I-112	DEWATERING CENTRIFUGE SYSTEM NO. 1 - P&ID 3
119	W25.00-I-121	DEWATERING CENTRIFUGE SYSTEM NO. 2 - P&ID 2
120	W25.00-I-122	DEWATERING CENTRIFUGE SYSTEM NO. 2 - P&ID 3
121	W25.00-I-131	DEWATERING CENTRIFUGE SYSTEM NO. 3 - P&ID 2
122	W25.00-I-132	DEWATERING CENTRIFUGE SYSTEM NO. 3 - P&ID 3
123	W25.00-I-141	DEWATERING CENTRIFUGE SYSTEM NO. 4 - P&ID 2
124	W25.00-I-142	DEWATERING CENTRIFUGE SYSTEM NO. 4 - P&ID 3
	W30 ----------	**WAS THICKENING STATION**
125	W30.10-I-301.D	DEMOLITION - FOUL AIR AND SCRUBBER - P&ID 1
126	W30.10-I-302	FOUL AIR AND SCRUBBER - P&ID 2

GENERAL NOTES

1. ITEMS SHOWN IN BUBBLES ☁ OR IN BOLD ON REVISED RECORD DRAWINGS INDICATE WORK UNDER THIS CONTRACT.

   REFERENCES TO OTHER DRAWINGS ON THE REVISED DRAWINGS ARE SHOWN SCREENED. SCREENED REFERENCES MAY BE FOUND IN THE ORIGINAL CONTRACT DOCUMENTS.

2. NOT ALL EXISTING UNDERGROUND UTILITIES, WHICH MAY INTERFERE WITH NEW WORK, ARE SHOWN ON THE DRAWINGS.

3. PROJECT DRAWING NUMBERS ARE DEFINED AS FOLLOWS:
   AAA.BB-C-XXX.D WHERE:

   AAA = AREA CODE (3-DIGIT ALPHA/NUMERIC NUMBER FOR EACH FACILITY OR AREA)
   BB = SUBSTRUCTURE NUMBER (NUMBER FOR EACH STRUCTURE WITHIN FACILITY OR AREA)
   C = DISCIPLINE CODE LETTER
   - A - ARCHITECTURAL
   - C - CIVIL
   - E - ELECTRICAL
   - G - GENERAL
   - I - INSTRUMENTATION (P&ID)
   - L - LANDSCAPE
   - M - MECHANICAL
   - S - STRUCTURAL

   XXX = SERIAL NUMBER (MAY INCLUDE A DECIMAL AND/OR LETTER SUFFIX)
   - D - DEMOLITION DRAWING (OMITTED WHEN NOT USED)

4. AREA CODES AND SUBSTRUCTURE NUMBERS ARE DEFINED AS FOLLOWS:
   - SD266 - MULTIPLE PROJECT AREAS
   - W20.00 - ROADS AND FENCES
   - W24.00 - PRIMARY SEDIMENTATION TANKS
   - W25.00 - SLUDGE DEWATERING BUILDING
   - W30.00 - WAS THICKENING STATION
   - W30.10 - WAS THICKENING STATION (ALLEY AND SCRUBBER)

5. IF A CALL-OUT REFERENCES A DRAWING WITH THE SAME AREA CODE AND SUBSTRUCTURE NUMBER, THE AREA CODE AND SUBSTRUCTURE NUMBER ARE NOT SHOWN. ONLY THE DISCIPLINE CODE AND SERIAL NUMBER ARE SHOWN.

REGISTERED PROFESSIONAL ENGINEER
CHUN DEAN CHEN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

5/25/06

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	A. MUNOZ
	DRAWN BY:	A. MUNOZ
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

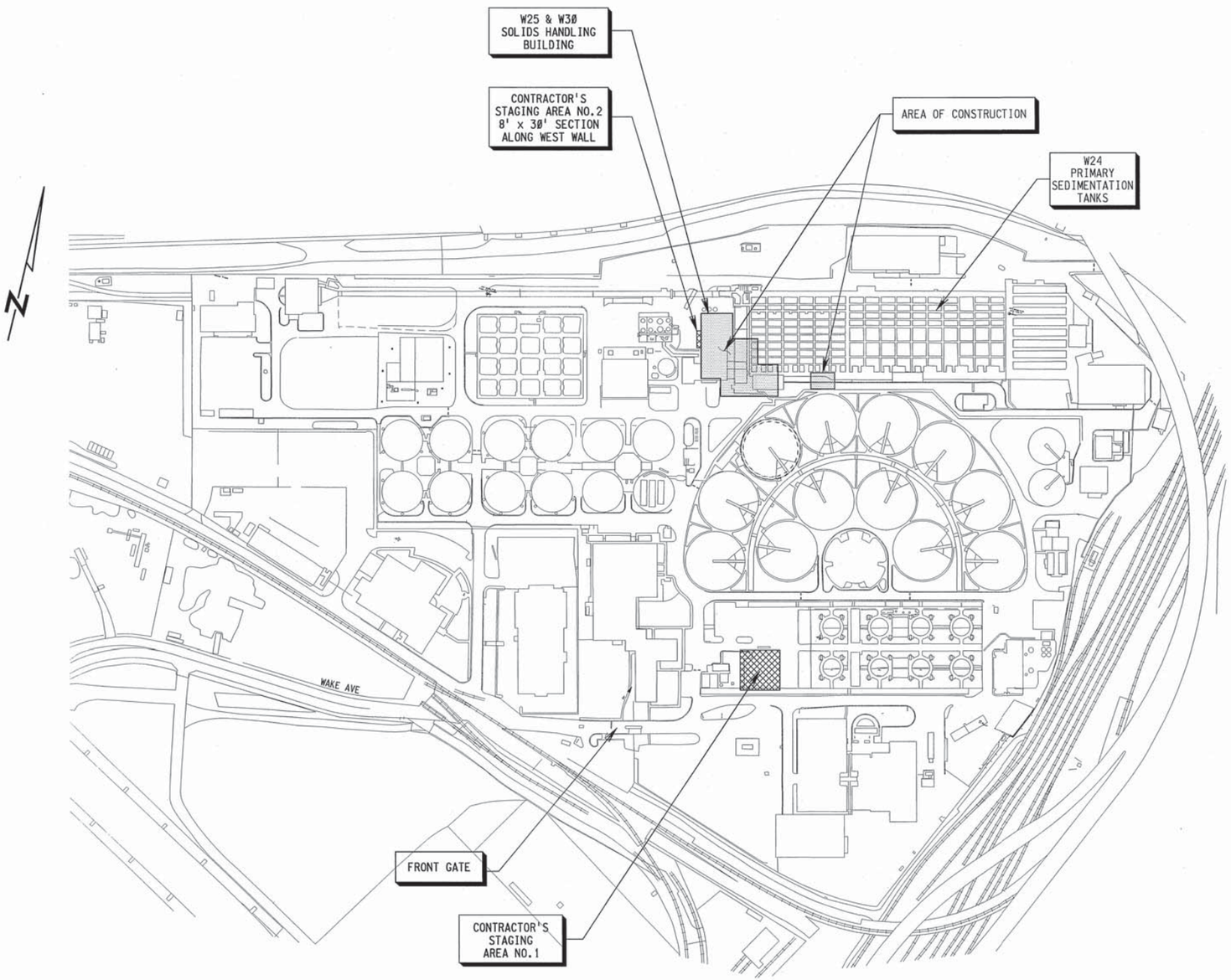
GENERAL
INDEX OF DRAWINGS AND GENERAL NOTES

SHEET NO. 1

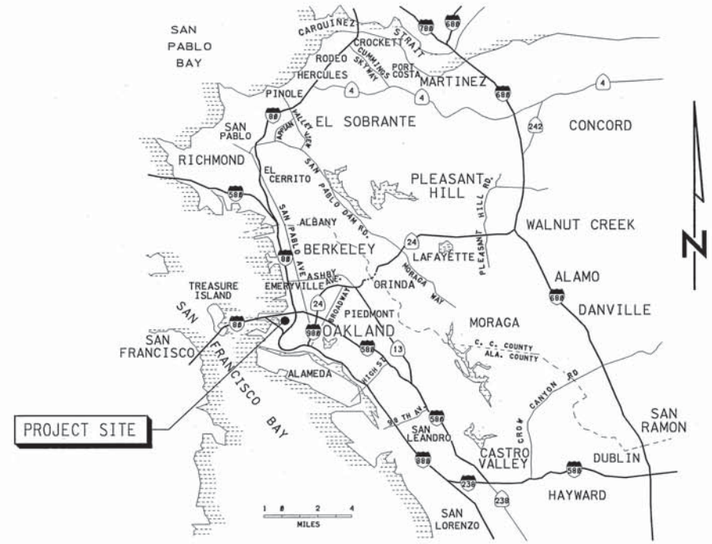
SCALE	NONE	SD266-G-001	0
DATE	MAY 2006	DRAWING NUMBER	REV.

REF 7: sd266dr-mst
REF 8:
REF 4:
REF 1:
REF 2:
REF 3:
REF 4:
REF 5:
REF 6:

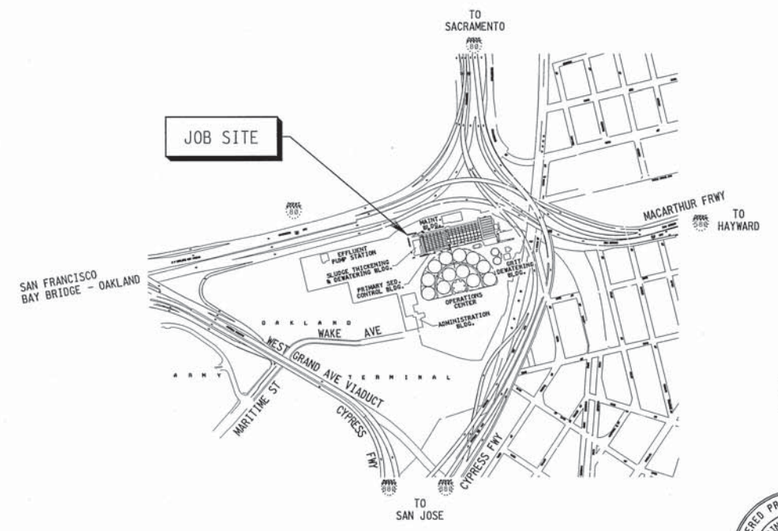
USER: dbreiden
DATE: 10-MAY-2006 13:32
FILE: \\WATP_01\data\data\drafters\SD\sd266\sd266g001.dgn
PLOT SCALE: 0.083334



SITE MAP



LOCATION MAP



VICINITY MAP

NOTE:

SEE DRAWING W20.00-C-113.1 FOR LOCATION OF TEMPORARY DEWATERING FACILITY STAGING AREA (BY OTHERS).

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
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STATE OF CALIFORNIA
5/25/06

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	R. RUIZ / J. TRAN
	DRAWN BY:	A. MUNOZ
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

GENERAL

SITE MAP, LOCATION MAP AND VICINITY MAP

SHEET NO. 2

SCALE	NONE	SD266-G-002	Ø
DATE	MAY 2006	DRAWING NUMBER	REV.

REF 1: \\wwtp_01\data\data\drafters\sdlinmap\master_drawings\wwpsite66514.dgn
REF 2: \\wwtp_01\data\drafters\borders\sd266bdr.mst
REF 3:
REF 7:
REF 8:
REF 9:
REF 4:
REF 5:
REF 6:

USER: cdris
DATE: 23-MAY-2006 15:22
FILE: \\Wwtp_01\data\drafters\SD\sd266\sd266g002-r00
PLOT SCALE: 150:1

A

A	AMBER, AMMETER, AUTOMATIC
AB	ANCHOR BOLT
ABAND	ABANDONED
ABC	AGGREGATE BASE COURSE
ABS	ABSOLUTE
ABV	ABOVE
AC	AIR CONDITIONING, ALTERNATING CURRENT, ASPHALTIC CONCRETE
ACC	AREA CONTROL CENTER
ACI	AMERICAN CONCRETE INSTITUTE
ACK	ACKNOWLEDGE
ACST	ACOUSTIC
ADD	ADDITION
ADJ	ADJACENT, ADJUST
ADPTR	ADAPTER
AF	AIR FILTER, AMPERE FRAME
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AGG	AGGREGATE
AI	ANALOG INPUT
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AIT	ANALYTICAL INDICATOR TRANSMITTER
AL	ALUMINUM, ACOUSTIC LINED
ALLOW	ALLOWANCE
ALM	ALARM
ALT	ALTERNATE
AM	AUTO-MANUAL
AMB	AMBIENT
AMP	AMPERES
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
AO	ANALOG OUTPUT
AP	ACCESS PANEL
APP	APPLIED
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AS	ADJUSTABLE SWITCH, AIR SUPPLY, AMMETER SWITCH, AMPERE SENSOR
ASB	ASBESTOS
ASC	ADJUSTABLE SPEED CONTROLLER
ASPH	ASPHALT
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AT	AMPERE TRIP
ATM	ATMOSPHERE
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
AWG	AMERICAN WIRE GAUGE
AWS	AMERICAN WELDING SOCIETY
AWWA	AMERICAN WATER WORKS ASSOCIATION

B

B	BELL, BLUE
BB	BOTTOM BAR
BBH	BASEBOARD HEATER
B/C	BOTTOM OF CONCRETE
BC	BARE COPPER, BEGINNING OF CURVE, BOLT CIRCLE
B/D	BOTTOM OF DUCT
BD	BOARD
BDD	BACKDRAFT DAMPER
BF	BLIND FLANGE
BFP	BACKFLOW PREVENTER
BFV	BUTTERFLY VALVE
BG	BELOW GRADE
BHP	BRAKE HORSEPOWER
BITUM	BITUMINOUS
BKR	BREAKER
BLDG	BUILDING
BLK	BLOCK, BLACK
BLKG	BLOCKING
BLT	BOLT
BLU	BLUE
BLV	BALL VALVE
BM	BEAM, BENCHMARK
BO	BLOWOFF
BOT	BOTTOM
B/P	BOTTOM OF PIPE
BP	BYPASS
BRG	BEARING

B (CONTINUED)

BRK	BREAK
BRN	BROWN
BRZ	BRONZE
B&S	BELL & SPIGOT
BS	BOTH SIDES
BSHG	BUSHING
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
BV	BALL VALVE
BVC	BEGINNING OF VERTICAL CURVE
BTWN	BETWEEN

C

C	CABLE, CENTIGRADE, CLOSE, CONDUIT, STRUCTURAL STEEL CHANNEL
CAB	CABINET
CALIB	CALIBRATE
CAP	CAPACITY
CAT	CATALOG
CB	CATCH BASIN, CIRCUIT BREAKER
CC	CONTROL CABLE, COOLING COIL, CURB COCK
C-C	CENTER TO CENTER
CD	CEILING DIFFUSER, CENTER DISTANCE
CDF	CONTROLLED DENSITY FILL
CEM	CEMENT
CER	CERAMIC
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CG	CEILING GRILLE
CHAM	CHAMFER
CHEM	CHEMICAL
CI	CAST IRON
CIMJ	CAST IRON MECHANICAL JOINT
CIP	CAST-IN-PLACE
CIR	CIRCLE
CIRC	CIRCULAR
CJ	CONSTRUCTION JOINT
CKT	CIRCUIT
CKV	CHECK VALVE
CL	CLASS, CONTROL LOOP, CLOSE
CL2	CHLORINE
CLT	CURRENT LIMITING
CLG	CEILING
CLJ	CONTROL JOINT
CLKG	CAULKING
CLO	CLOSET
CLR	CLEAR, CLEARANCE
CMU	CONCRETE MASONRY UNIT
CNDCT	CONDUCTIVITY
CNTL	CONTROL
CNTLR	CONTROLLER
CNTR	COUNTER
CNTOR	CONTACTOR
CO	CLEANOUT, CONTROL OUTPUT, COMPANY
CO2	CARBON DIOXIDE
COAX	COAXIAL
COL	COLUMN
COM	COMMON
COMP	COMPACTION
COMPT	COMPARTMENT
CON	CONCENTRIC
CONC	CONCRETE
COND	CONDUCTIVITY
CONF	CONFERENCE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS, CONTINUATION
CONTD	CONTINUED
COORD	COORDINATE
COP	COPPER PIPE
CORR	CORRUGATED
COTG	CLEANOUT TO GRADE
CP	CONTROL POINT
CPS	CATHODIC PROTECTION STATION
CPT	CONTROL POWER TRANSFORMER
CR	CEILING REGISTER, CONTROL RELAY
CRE	CORROSION RESISTANT
CRG	CARRIAGE
CRS	COATED RIGID STEEL CONDUIT, COLD ROLL STEEL

C (CONTINUED)

CS	CONTROL STATION, CONTROL SWITCH, CUP SINK
CT	CONDUIT, COURT, CURRENT TRANSFORMER
CTD	CENTERED
CTR	CENTER
CU FT	CUBIC FOOT
CU IN	CUBIC INCH
CU YD	CUBIC YARD
CV	CONTROL VALVE
CW	COLD WATER, CLEAR WELL

D

d	PENNY (NAIL SIZE)
D	DEPTH, DIMMER, DISCHARGE
DB	DECIBEL, DRY BULB
DBL	DOUBLE
DC	DIRECT CURRENT
DCS	DISTRIBUTED CONTROL SYSTEM
DECR	DECREASING
DEG	DEGREES
DEPT	DEPARTMENT
DESC	DESCRIPTION
DET	DETAIL
DF	DOUGLAS FIR
DF/L	DOUGLAS FIR/LARCH
DI	DIGITAL INPUT, DROP INLET
DIA	DIAMETER
DIAG	DIAGRAM, DIAGONAL
DIFF	DIFFERENCE, DELTA
DIMJ	DUCTILE IRON MECHANICAL JOINT
DIM	DIMENSION
DISC	DISCONNECT
DISCH	DISCHARGE
DISP	DISPENSER
DIV	DIVISION
DL	DAYLIGHT, DOOR LOUVER, DISCRETE LATCHED OUTPUT
DMV	DIAPHRAGM VALVE
DN	DOWN
DO	DIGITAL OUTPUT, DITTO
DP	DEEP, DISCHARGE PRESSURE, DIFFERENTIAL PRESSURE
DPDT	DOUBLE POLE DOUBLE THROW
DR	DRAIN, DOOR, DRIVE
DS	DOWNSPOUT
DWG	DRAWING
DWL	DOWEL
DWV	DRAIN WASTE VENT
DWY	DRIVEWAY

E

E	EAST
(E)	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EBMUD	EAST BAY MUNICIPAL UTILITY DISTRICT
EC	END OF CURVE
ECC	ECCENTRIC
EE	EMERGENCY EYEWASH
E/E	VOLTAGE-TO-VOLTAGE
EF	EACH FACE, EXHAUST FAN
EFF	EFFICIENCY
EFL	EFFLUENT
E/I	VOLTAGE-TO-CURRENT
EJ	EXPANSION JOINT
EL	ELEVATION (NUMERIC)
ELEC	ELECTRICAL
ELEV	ELEVATION (VIEW), ELEVATOR
ELB	ELBOW
EMBED	EMBEDMENT
EMER	EMERGENCY
EMTY	EMPTY
ENCL	ENCLOSURE
ENG	ENGINE
ENGR	ENGINEER
EO	ELECTRIC OPERATOR
EP	EDGE OF PAVEMENT
EPV	ECCENTRIC PLUG VALVE
EQ	EQUAL
EQPT	EQUIPMENT

E (CONTINUED)

EQUIV	EQUIVALENT
ESP	EXTERNAL STATIC PRESSURE
EST	ESTIMATE
ETM	ELAPSED TIME METER
ETW	EDGE OF TRAVELLED WAY
EVC	END OF VERT CURVE
EW	EACH WAY
EWC	ELECTRIC WATER HEATER
EX	EXAMPLE, EXTRA
EXH	EXHAUST
EXP	EXPANSION, EXPOSED
EXIST	EXISTING
EXT	EXTERIOR
EXTR	EXTRUDED

F

F	FUSE, FAHRENHEIT
FAB	FABRICATE
FAC	FACTORY
FACIL	FACILITY
FB	FLAT BAR
FC	FACE OF CURB, FLEXIBLE CONNECTION, FLEXIBLE COUPLING, FAIL CLOSED, FERRIC CHLORIDE
FCA	FLANGED COUPLING ADAPTER
FCO	FLOOR CLEANOUT
FD	FIRE DAMPER, FLOOR DRAIN, FOUND
FDBK	FEEDBACK
FDC	FLEXIBLE DUCT CONNECTION
FDR	FEEDER
FF	FINISH FLOOR
F-F	FACE TO FACE
F/F	FACE OF FOOTING
FG	FINISH GRADE
FGL	FIBERGLASS
FH	FIRE HYDRANT, FLAT HEAD
FI	FLOW INDICATOR
FIG	FIGURE
FIN	FINISHED
FIT	FLOW INDICATOR TRANSMITTER
FL	FLASHING, FLOWLINE
FLH	FLATHEAD
FLEX	FLEXIBLE
FLG	FLANGE
FLGD	FLANGED
FLP	FAIL TO LAST POSITION
FLR	FLOOR
FLS	FLOAT SWITCH
FLUOR	FLUORESCENT
FMH	FLEXIBLE METAL HOSE
FND	FOUNDATION
FO	FAIL OPEN
FPM	FEET PER MINUTE
FPRF	FIREPROOF
FPS	FEET PER SECOND
FPT	FEMALE PIPE THREAD
FR	FILTRATION, FLOW RECORDER
FRP	FIBERGLASS REINFORCED PIPE
FS	FAR SIDE, FLOW SWITCH
FT	FOOT, FEET, FLOW TRANSMITTER
FTG	FOOTING
FU	FUSE
FURN	FURNACE
FUT	FUTURE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FXTR	FIXTURE
FW	FACE OF WALL, FILTERED WATER
FWD	FORWARD

G

G	GAS, GREEN
GA	GAUGE OR GAGE
GA/TS	GALVANIC ANODE/TEST STATION
GAL	GALLON
GALV	GALVANIZED
GC	GAS COCK
GDR	GRINDER
GFCI	GROUND-FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
GI	GALVANIZED IRON
GL	GLASS, GLUE LAM
GLV	GLOBE VALVE
GND	GROUND
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRADE
GRN	GREEN
GSKT	GASKET
GSM	GALVANIZED SHEET METAL
GSP	GALVANIZED STEEL PIPE
GTV	GATE VALVE
GUT	GUTTER
GWB	GYPSUM WALLBOARD
GYP	GYPSUM

H

H	HEIGHT, HIGH, HAND, HORN, HORIZONTAL
HB	HOSE BIBB
HC	HEATING COIL, HOLLOW CORE
HD	HEAD
HDG	HOT-DIPPED GALVANIZED
HDP	HIGH DISCHARGE PRESSURE
HDR	HEADER
HDWD	HARDWOOD
HDWE	HARDWARE
HESO	HYDRAULIC EMERGENCY SHUTOFF VALVE
HEX	HEXAGONAL
HH	HAND HOLE, HIGH-HIGH
HHWR	HEATING HOT WATER RETURN
HHWS	HEATING HOT WATER SUPPLY
HOA	HAND-OFF-AUTOMATIC
HOR	HAND-OFF-REMOTE
HORIZ	HORIZONTAL
HP	HIGH PRESSURE, HIGH POINT, HORSEPOWER
HR	HOUR, HANDRAIL
HS	HIGH SPEED
HSG	HOUSING
HT	HEAT
HTR	HEATER
HV	HIGH VOLTAGE, HOSE VALVE
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HW	HOT WATER
HWH	HOT WATER HEATER
HWL	HIGH WATER LEVEL
HWR	HOT WATER RETURN
HWY	HIGHWAY
HYDR	HYDRAULIC
HYD	HYDRANT
HZ	HERTZ (CYCLES PER SECOND)

I

IA	INSTRUMENT AIR
IC	INTERRUPTING CAPACITY
ID	IDENTIFICATION, INSIDE DIAMETER
I&C	INSTRUMENTATION & CONTROL
I/E	CURRENT-TO-VOLTAGE
IFC	IN FURRED CEILING
IFS	IN FURRED SPACE
IFW	IN FURRED WALL

I (CONTINUED)

I/I	CURRENT-TO-CURRENT
IJ	INSULATING JOINT
IJS	IN JOIST SPACE
IM	INTRUSION MONITOR
IN	INCH
INCAND	INCANDESCENT
INF	INFLUENT
INS	INSTRUMENTATION
INSUL	INSULATION
INST	INSTANTANEOUS
INT	INTERIOR
INTFC	INTERFACE
INSTR	INSTRUMENT
INTMD	INTERMEDIATE
INTLK	INTERLOCK
INV	INVERT
INV EL	INVERT ELEVATION
I/O	INPUT/OUTPUT
IR	INSIDE RADIUS
IS	INTRUSION SWITCH
IW	IN WALL
IWC	IN WALL CHASE

J

J	JUNCTION BOX
JB	JUNCTION BOX
JCT	JUNCTION
JP	JOINT POLE
JST	JOIST
JT	JOINT

K

K	KEY, KEY INTERLOCK
KGV	KNIFE GATE VALVE
KIP	THOUSAND POUNDS
KSF	KIPS PER SQUARE FOOT
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
KWHD	KILOWATT HOUR DEMAND METER

L

L	LENGTH, LOW SPEED, LIGHTING CONTRACTOR, LOW
LA	LIGHTNING ARRESTER
LAB	LABORATORY
LAM	LAMINATED
LAV	LAVATORY
LB	POUND
LCP	LOCAL CONTROL PANEL
LDP	LOW DISCHARGE PRESSURE
LF	LINEAR FEET
LI	LEVEL INDICATOR
LIT	LEVEL INDICATOR TRANSMITTER
LL	LOW-LOW
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOA	LENGTH OVERALL
LOC	LOCATION, LOCAL
LONG	LONGITUDINAL
LOS	LOCK OUT STOP PUSHBUTTON
LP	LOW PRESSURE, LOW POINT
LR	LONG RADIUS, LATCHING RELAY, LOCAL-REMOTE
LS	LEVEL SWITCH, LIME SLURRY
LSC	LANDSCAPE
LSP	LOW SUCTION PRESSURE

L (CONTINUED)

LT	LEFT, LIGHT, LEVEL TRANSMITTER
LT FLEX	LIQUID TIGHT FLEXIBLE CONDUIT
LV	LOW VOLTAGE
LTG	LIGHTING
LVL	LEVEL
LVR	LOUVER
LWL	LOW WATER LEVEL
LWR	LOWER

M

M	MOTOR, MAGNETIC CONTACTOR COIL
mA	MILLIAMPERE
MAINT	MAINTENANCE
MAN	MANUAL
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MBH	1000 BTU'S PER HOUR
MBR	MEMBER
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MEMB	MEMBRANE
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MI	MALLEABLE IRON
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MK	MARK
ML&CS	MORTAR LINED & COATED STEEL
MLLW	MEAN LOWER LOW WATER
ML&PCS	MORTAR LINED & PLASTIC COATED STEEL
MLW	MEAN LOW WATER
M-M	MONUMENT TO MONUMENT
MO	MASONRY OPENING, MOTOR OPERATOR
MON	MONUMENT
MORT	MORTAR
MPT	MALE PIPE THREAD
MS	MOTOR STARTER
MSL	MEAN SEA LEVEL
MT	MOUNT
MTD	MOUNTED
MTG	MOUNTING
MTS	MOTOR THERMAL SWITCH
MTRG	METERING
MULT	MULTIPLY
MV	MILLIVOLT
MVA	MEGA-VOLT AMPERE
MW	MICROWAVE, MEGAWATT
MWS	MAXIMUM WATER SURFACE
MWWTP	MAIN WASTEWATER TREATMENT PLANT

NOTES

1. SEE DRAWING STD-G-002 FOR ABBREVIATIONS N THRU Z, AND FOR SYMBOLS.
2. ABBREVIATIONS OR SYMBOLS SHOWN ON DISCIPLINE SPECIFIC WASTEWATER STANDARD DRAWINGS SHALL TAKE PRECEDENCE OVER ABBREVIATIONS OR SYMBOLS SHOWN ON THIS DRAWING.

REGISTERED PROFESSIONAL ENGINEER — DAWN DEAN WARREN — No. C65259 Exp. 09/30/07 — CIVIL — STATE OF CALIFORNIA

5/25/06

3" ON ORIGINAL DOCUMENT

0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY; R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY; R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

GENERAL

ABBREVIATIONS FOR WASTEWATER FACILITIES A THRU M

SHEET NO. 3

SCALE	NONE	SD266-G-003	0
DATE	MAY 2006	DRAWING NUMBER	REV.

REF 1: sd266dr.mst
REF 2:
REF 3:

REF 4:
REF 5:
REF 6:

REF 7:
REF 8:
REF 9:

USER: dkreiden
DATE: 05/24/2006 13:22
FILE: \\WWTP_DN\data\data\drafters\SD\sd266\sd266g003.r00

PLOT SCALE: 0.083334:1

N

N	NEUTRAL, NORTH
(N)	NEW
NA	NOT APPLICABLE, NOT AVAILABLE, NON-AUTOMATIC
NAD	NORTH AMERICAN DATUM
NC	NORMALLY CLOSED
NE	NORTHEAST
NEC	NATIONAL ELECTRICAL CODE
NECY	NECESSARY
NEG	NEGATIVE
NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NO.	NUMBER
NOM	NOMINAL
NOMR	NORMAL
NP	NAMEPLATE
NPS	NOMINAL PIPE SIZE
NPT	NATIONAL PIPE THREAD
NS	NEAR SIDE
NSG	NON-SHRINK GROUT
NTS	NOT TO SCALE
NW	NORTHWEST

O

O3	OZONE
OA	OUTSIDE AIR, OVERALL
OAD	OUTSIDE AIR DAMPER
OAT	OUTSIDE AIR TEMPERATURE
OC	ON CENTER, OPEN-CLOSE
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OHC	OVERHEAD CRANE
OL	OVERLOAD
OO	ON-OFF
OP	OPEN
OP/NET	OPERATIONS NETWORK
OPNG	OPENING
OPP	OPPOSITE
OPS	OPERATION(S)
OR	OUTSIDE RADIUS
ORG	ORANGE
OSD	OPEN SITE DRAIN
OS&Y	OUTSIDE SCREW & YOKE
OVFL	OVERFLOW

P

P	POLE, PILOT
PB	PUSH BUTTON, PULL BOX
PC	POINT OF CURVATURE, PHOTO CELL, POLYMER COAGULANT, PORTLAND CEMENT
PCC	POINT OF COMPOUND CURVE
PDI	PULSE DURATION INPUT
PERF	PERFORATED
PERM	PERMANENT, PERMISSIBLE
PF	POWER FACTOR, PREFILTER
PG&E	PACIFIC GAS & ELECTRIC
PGV	PLUG VALVE
pH	HYDROGEN-ION CONCENTRATION
PH	PHASE, POWER HOUSE
PHC	PREHEAT COIL
PI	POINT OF INTERSECTION, PULSE INPUT, PRESSURE INDICATOR
P&ID	PROCESS & INSTRUMENT DIAGRAM
PK	PEAK
P/L	PROPERTY LINE
PLAS	PLASTER
PLC	PROGRAMMABLE LOGIC CONTROL
PLCS	PLACES
PLSTC	PLASTIC
PLUM	PLUMBING
PLYWD	PLYWOOD
PMP	PUMP
PMPSCT	PUMP SUCTION
PNEU	PNEUMATIC
PNL	PANEL
PO	POLYMER
POC	POINT ON CURVE, POINT OF CONNECTION

P (CONTINUED)

PP	POWER POLE, PUMPING PLANT
PPLN	PIPELINE
PR	PAIR
PRC	POINT OF REVERSE CURVE
PRV	PRESSURE REGULATING VALVE, PRESSURE RELIEF VALVE
PRCST	PRECAST
PREFAB	PREFABRICATED
PRESS	PRESSURE
PRI	PRIMARY
PROP	PROPERTY
PRPSD	PROPOSED
PS	POWER SUPPLY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	PSI (ABSOLUTE)
PSIG	PSI (GAGE)
PT	POINT, POINT OF TANGENCY, POTENTIAL TRANSFORMER
PTN	PARTITION
PTS	POINTS
PV	PROCESS VARIABLE, PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PW	POTABLE COLD WATER
PWH	POTABLE HOT WATER
PWR	POWER

Q

QM	WATER QUALITY
QTY	QUANTITY
QUAL	QUALITY

R

R	RADIAL, RADIUS, RED, RISER, RUN
RA	RETURN AIR
RAD	RADIUS
RC	REINFORCED CONCRETE
RCF	RECIRCULATING FAN
RCP	REINFORCED CONCRETE PIPE
RCCP	REINFORCED CONCRETE CULVERT PIPE
RCVR	RECEIVER
RCVD	RECEIVED
RCPT	RECEPTACLE
RD	ROAD, ROOF DRAIN
RDA	RETURN AIR DAMPER
RDCR	REDUCER
RDL	ROOF DRAIN LEADER
RDWD	REDWOOD
RED	REDUCING, RED
REBAR	REINFORCING BAR
RECT	RECTANGULAR
REF	REFERENCE
REFR	REFRIGERATOR
REINF	REINFORCED, REINFORCEMENT
REL	RELATIVE
REM	REMOVABLE, REMOTE
REQD	REQUIRED
REQT	REQUIREMENT
RESIL	RESILIENT
RESV	RESERVOIR
RET	RETURN (CURB), RETAINING (WALL)
REV	REVERSE, REVISION
REVD	REVISED
RF	RETURN FAN
RGH	ROUGH
RGLTR	REGULATOR
RGS	RIGID GALVANIZED STEEL
RGTR	REGISTER
RH	REHEAT COIL
RI	RODDING INLET
RL	RAIN LEADER
RLA	RATED LOAD AMPS
RLY	RELAY
RM	ROOM, RAPID MIX

R (CONTINUED)

RMS	ROOT MEAN SQUARE
RMT	REMOTE
RMVD	REMOVED
RND	ROUND
RO	ROUGH OPENING
RP	RADIAL POINT
RPM	REVOLUTIONS PER MINUTE
RS	RIGID STEEL CONDUIT
RSP	REMOTE SET (CASCADE)
RS/PVC	RIGID STEEL, PVC COATED
RT	RIGHT, REMOTE TELEMETRY
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
RVR	REDUCED VOLTAGE REVERSING
RV	ROOF VENT
RVNR	REDUCED VOLTAGE NON-REVERSING
RW	RAW WASTEWATER
R/W	RIGHT-OF-WAY

S

S	SINGLE, SOUTH, SIREN, SOIL OR WASTE, SUCTION, SOURCE
SA	SUPPLY AIR, SOFTWARE ALARM, SURGE ARRESTER
SAN	SANITARY
SB	SODIUM BISULFITE
SC	SOLID CORE, SPEED CONTROL
SCD	SCREWED, STREAMING CURRENT DETECTOR
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE (SPEC FOR MATL)
SCHED	SCHEDULE (TABLE, TIME)
SCRN	SCREEN
SCV	SWING CHECK VALVE
SD	SMOKE DETECTOR, STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SE	SOUTHEAST
SEC	SECOND, SECONDARY
SECT	SECTION
SEL	SELECTOR
SEP	SEPARATOR
SEW	SEWER
SF	SUPPLY FAN
SGT	SLUICE GATE
SH	SHOWER, SPACE HEATER
SHT	SHEET
SHLD	SHIELD
SIM	SIMILAR
SK	SINK
S/N	SOLID NEUTRAL
SLGT	SLIDE GATE
SLP	SLOPE
SMS	SHEET METAL SCREWS
SO2	SULFUR DIOXIDE
SOG	SLAB ON GRADE
SOL	SOLENOID
SOLN	SOLUTION
SP	SPARE, SUCTION PRESSURE, SUMP PUMP
SPC	SPACE
SPCR	SPACER
SPD	SPEED
SPEC	SPECIFICATIONS
SPST	SINGLE POLE, SINGLE THROW
SPV	SPOOL VALVE
SQ	SQUARE
SS	SANITARY SEWER, SUBSTATION, START-STOP
SSMH	SANITARY SEWER MANHOLE
SST	STAINLESS STEEL
ST	START
STA	STATION
STD	STANDARD
STL	STEEL
STO	STORAGE
STP	STOP
ST PR	STATIC PRESSURE
STR	STRAINER
STRUCT	STRUCTURAL
SUBST	SUBSTITUTE
SUBSTA	SUBSTATION

S (CONTINUED)

SUCT	SUCTION
SURF	SURFACE
SUSP	SUSPENDED
SUW	SURFACE WASH
SV	SOLENOID VALVE, SIGNAL VOLTAGE
SW	SWITCH
SWGR	SWITCHGEAR
SYMM	SYMMETRICAL

T

T	THERMOSTAT, TREAD, THROW, TIME
TB	TERMINAL BLOCK,TERMINAL BOX, TOP BAR
T&B	TOP AND BOTTOM
TBG	TUBING
TC	TIME CLOCK, TIME CLOSE
T/C	THERMOCOUPLE
TCV	TEMPERATURE CONTROL VALVE
TD	TEMPERATURE DETECTOR RELAY, TIME DELAY
TDE	TEST DEVICE
TDH	TOTAL DYNAMIC HEAD
TDR	TIME DELAY RELAY
TEFC	TOTALLY ENCLOSED FAN COOLED (MOTORS)
TEL	TELEPHONE
TEMP	TEMPERATURE, TEMPORARY
TERM	TERMINAL
TEWAC	TOTALLY ENCLOSED WATER TO AIR COOLED (MOTORS)
T&G	TONGUE AND GROOVE
TH	TOTAL HEAD
THD	THREAD
THHN	HEAT RESISTANT THERMOPLASTIC ELECTRICAL WIRE
THK	THICK, THICKNESS
THRU	THROUGH
THWN	MOISTURE & HEAT RESISTANT THERMOPLASTIC ELECTRICAL WIRE
TIT	TEMPERATURE INDICATOR TRANSMITTER
TJB	TERMINAL JUNCTION BOX
TK	TANK
T/L	TRANSIT LINE
TMPD	TEMPERED
TOC	TOP OF CONCRETE, TOP OF CURB
TOP	TOP OF PAVEMENT
TOS	TOP OF STEEL
TOT	TOTAL
TOW	TOP OF WALL
TR	TOP REGISTER, TIMER RELAY
TRF	TRANSFER FAN
TRG	TRANSFER GRILLE
TRNSN	TRANSITION
TRTD	TREATED
TRTMT	TREATMENT
TS	STRUCTURAL STEEL TUBING, TIME SWITCH, TEST STATION
TSP	TWISTED SHIELDED PAIR, TOTAL STATIC PRESSURE
TST	TWISTED SHIELDED TRIAD
TSW	TEMPERATURE SWITCH
TTC	TELEPHONE TERMINAL CABINET
TW	TREATED WATER
TURB	TURBIDITY
TYP	TYPICAL

U

U	HEAT TRANSFER COEFFICIENT
UBC	UNIFORM BUILDING CODE
U-F	UNFORMED, FLOAT FINISH
UFC	UNIFORM FIRE CODE
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
UPR	UPPER
UPS	UNINTERRUPTIBLE POWER SUPPLY
UR	URINAL
USS	UNIT SUBSTATION
U-TB	UNFORMED, TROWELED, HAIR BRUSH FINISH
UVR	UNDER VOLTAGE RELAY

V

V	VENT, VOLTS, VOLTMETER, VERTICAL
VA	VIRTUAL OR CALCULATED ANALOG, VOLT AMPERE
VAC	VACUUM, VOLTS ALTERNATING CURRENT
VAR	VARIES, VARIABLE
VC	VERTICAL CURVE
VDC	VOLT, DIRECT CURRENT
VEL	VELOCITY
VER	VERIFY
VERT	VERTICAL
VF	VENT FAN
VFD	VARIABLE FREQUENCY DRIVE
VI	VIBRATION ISOLATOR
VIF	VERIFY IN FIELD
VLV	VALVE
VP	VAPOR PROOF
VPC	POINT OF VERTICAL CURVATURE
VPT	POINT OF VERTICAL TANGENCY
VS	VOLTMETER SWITCH
VTP	VERTICAL TURBINE PUMP
VTR	VENT THRU ROOF

W

W	WASTE, WATT, WEST, WHITE, WIDTH, WIRE, STRUCTURAL STEEL WIDE FLANGE
W/	WITH
WAW	WASH WATER
WB	WET BULB
WC	WATER CLOSET
WCO	WALL CLEANOUT
WDG	WINDING
WDO	WINDOW
WESP	WASTEWATER ENGINEERING STANDARD PRACTICE
WF	WATER FOUNTAIN
WH	WATER HEATER
WHD	WATT HOUR DEMAND
WHSE	WAREHOUSE
WHT	WHITE
WL	WATERLINE
WM	WATER METER, WATT METER
WOG	WATER, OIL, GAS
W/O	WITHOUT
WP	WEATHERPROOF, WORK POINT
WPJ	WEAKENED PLANE JOINT
WS	WATERSTOP, WATER SURFACE
WSHR	WASHER
WSP	WELDED STEEL PIPE
WT	WEIGHT
WTR	WATER
WTRPRF	WATERPROOF
WV	WATER VALVE
WW	WASTE WATER
WWF	WELDED WIRE FABRIC

X

XBAR	CROSSBAR
XCVR	TRANSCEIVER
XDCR	TRANSDUCER
XFMR	TRANSFORMER
XHVY	EXTRA HEAVY
XMSN	TRANSMISSION
XMTR	TRANSMITTER
XP	EXPLOSION PROOF
XRF	TRANSFORMER
XSECT	CROSS SECTION
XS	EXTRA STRONG
XXS	DOUBLE EXTRA STRONG

Y

Y	YELLOW
YD	YARD
YEL	YELLOW

SYMBOLS

∠	ANGLE (STRUCTURAL STEEL)
@	AT
℄	CENTERLINE
°	DEGREES
°C	DEGREES CENTIGRADE
°F	DEGREES FAHRENHEIT
ø	DIAMETER, PHASE
Δ	DELTA, DIFFERENCE
≥	GREATER THAN OR EQUAL TO
≤	LESS THAN OR EQUAL TO
#	NUMBER, POUND
/	OF
Ω	OHM
℔	PLATE (STRUCTURAL STEEL)
±	PLUS OR MINUS

NOTES

1. SEE DRAWING STD-G-001 FOR ABBREVIATIONS A THRU M.
2. ABBREVIATIONS OR SYMBOLS SHOWN ON DISCIPLINE SPECIFIC WASTEWATER STANDARD DRAWINGS SHALL TAKE PRECEDENCE OVER ABBREVIATIONS OR SYMBOLS SHOWN ON THIS DRAWING.

REGISTERED PROFESSIONAL ENGINEER · GAVIN DEAN WILSON · No. C65259 Exp. 09/30/07 · CIVIL · STATE OF CALIFORNIA

5/25/06

3" ON ORIGINAL DOCUMENT

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NO.	DATE	REVISION	BY	REC.	APP.

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

GENERAL

ABBREVIATIONS FOR WASTEWATER FACILITIES N THRU Z

SHEET NO. 4

SCALE NONE
DATE MAY 2006

SD266-G-004 DRAWING NUMBER

0 REV.

REF 7: sd266dr.mst
REF 8:
REF 9:

REF 4:
REF 5:
REF 6:

REF 1: sd266dr.mst
REF 2:
REF 3:

PLOT SCALE: 0.083334:1

USER: dkreiden
DATE: 18-MAY-2006 13:32
FILE: \\WTP-01\data\data\drafters\SD\sd266\sd266g004.dgn

PIPE AND FITTING SYMBOLS

DOUBLE LINE	SINGLE LINE	
		EXISTING PIPE
		NEW PIPE
		BELOW GRADE PIPE
		WELDED JOINT
		GROOVED END JOINT
		FLANGED JOINT
		LOCK TYPE PUSH-ON JOINT OR RESTRAINED MECHANICAL JOINT (AS SPECIFIED)
ADAPTER SIDE		GROOVED END ADAPTER FLANGE
		FLANGED COUPLING ADAPTER
		FLANGED COUPLING ADAPTER WITH THRUST TIES
		FLEXIBLE COUPLING
		FLEXIBLE COUPLING WITH THRUST TIES
		STEEL BELLOWS EXP JOINT
		ELASTOMER BELLOWS EXP JOINT
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER
		UNION
		CAP
		ANCHOR
		ELBOW, 90 DEGREE
		CROSS
		TEE
		ELBOW, 45 DEGREE
		LATERAL OR WYE
OFFSET TEE	OFFSET TEE	OFFSET TEE
		FLOW DIRECTION

NOTES:

1. ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLE LINE FITTINGS. FITTINGS WITH OTHER END PATTERNS ARE SHOWN SIMILARLY ON THE CONSTRUCTION DRAWINGS. SEE PIPING SPECIFICATIONS.
2. SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.

PRIMARY ELEMENT SYMBOLS

- STRAINER
- SIGHT GLASS
- FLEXIBLE (ELASTOMER) PIPE CONNECTION
- PRESSURE GAUGE
- PRESSURE GAUGE WITH DIAPHRAGM SEAL
- THERMOMETER
- ROTAMETER
- PIG LAUNCHER
- PIG CATCHER
- XX — AIR SET XX = SUPPLY PRESSURE - PSIG
- LEVEL (ULTRASONIC)
- QUICK DISCONNECT COUPLER
- ELECTROMAGNETIC FLOWMETER
- HB — HOSE BIBB/HOSE VALVE
- F — FLUSHING CONNECTION
- SPRAY NOZZEL
- ULTRASONIC FLOWMETER (CLAMP-ON)

VALVE SYMBOLS

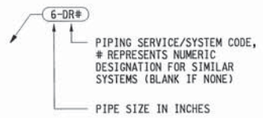
- GATE
- K — KNIFE GATE
- BUTTERFLY
- GLOBE
- OR — BALL
- SEATING PORT — ECCENTRIC PLUG
- PLUG OR COCK
- DIAPHRAGM
- PINCH
- SWING CHECK
- BALL CHECK
- HOSE BIBB (H/B)
- S — SAMPLE
- MUD
- PRESSURE RELIEF
- AIR AND/OR VACUUM RELEASE
- REGULATED SIDE — PRESSURE CONTROL
- MULTI-PORT VALVE (BALL VALVE SHOWN. FOR OTHER VALVE TYPES, APPROPRIATE VALVE SYMBOL SHOWN.) ARROWS INDICATE FLOW PATTERN. SEATING PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.
- S — SOLENOID VALVE

GATE SYMBOLS

- SLUICE
- BUTTERFLY
- FLAP
- FABRICATED SLIDE
- SHEAR
- M — MOTORIZED ACTUATOR

PIPING DESIGNATION SYSTEM

NEW PIPING LABEL



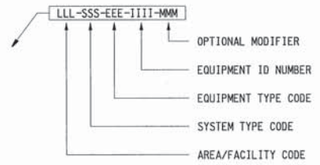
EXISTING PIPING LABEL

NOTES:

1. PIPING SYSTEM CODES SHALL BE AS DEFINED ON DRAWING STD-G-005.
2. PIPING MATERIALS FOR EACH SERVICE SHALL BE AS SHOWN ON THE PIPE SCHEDULE OR AS SPECIFIED IN SPECIFICATION DIVISION 15.
3. DESIGNATION SYSTEM SIMILAR FOR HVAC DUCTING.
4. SEE PIPING SCHEDULE AND SPECIFICATIONS FOR NEW PIPING AND MATERIALS. IF EXISTING PIPING MATERIAL VARIES FROM WHAT IS LISTED IN THE PIPING SCHEDULE, THE MATERIAL SHALL BE INCLUDED IN THE PIPING LABEL.

EQUIPMENT DESIGNATION SYSTEM

NEW EQUIPMENT LABEL



EXISTING EQUIPMENT LABEL

NOTES:

1. EQUIPMENT TAG NUMBERING SHALL FOLLOW WESP 130. SEE STANDARD DRAWINGS STD-G-004, STD-G-005 & STD-G-006 FOR APPROPRIATE CODES.
2. SEE EQUIPMENT SCHEDULE(S) AND SPECIFICATIONS FOR NEW EQUIPMENT.

PIPING NOTES

1. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED POINTS.
2. SIZE OF FITTINGS SHOWN ON PLANS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.
3. LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. NO ATTEMPT HAS BEEN MADE TO SHOW ALL REQUIRED PIPE SUPPORTS IN ALL LOCATIONS. THE ABSENCE OF PIPE SUPPORTS AND DETAILS ON ANY DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR PROVIDING THEM THROUGHOUT THE PLANT. FINAL SUPPORT REQUIREMENTS SHALL BE DETERMINED IN THE FIELD AND REVIEWED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING SHALL BE AS SPECIFIED. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS ON PIPE HANGERS AND SUPPORTS.
4. ALL FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST TIES OR ANCHORS, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.
5. SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE PLANS, WHEREVER APPLICABLE. WHERE ABBREVIATIONS OR SYMBOLOGY CONFLICT WITH DRAWING STD-G-002, THIS SHEET SHALL PREVAIL. NOT ALL OF THE VARIOUS PIPING COMPONENTS ARE NECESSARILY USED IN THE PROJECT.
6. NUMBER AND LOCATION OF UNIONS SHOWN ON PLANS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.
7. WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE FLEXIBLE JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTER.
8. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS. DRAWINGS ARE DIAGRAMMATIC AND NO ATTEMPT HAS BEEN MADE TO SHOW ALL EXISTING PIPING.

REGISTERED PROFESSIONAL ENGINEER — CARIN DEAN KREIDEN — No. C65259 Exp. 09/30/07 — CIVIL — STATE OF CALIFORNIA
5/25/06

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NO.	DATE	REVISION	BY	REC.	APP.

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

MECHANICAL

PIPING AND EQUIPMENT
SYMBOLS, DESIGNATIONS AND GENERAL NOTES

SHEET NO. 38

SCALE	NONE	SD266-M-001	0
DATE	MAY 2006	DRAWING NUMBER	REV.

REF 7: REF 8: REF 9:
REF 4: REF 5: REF 6:
REF 1: sd266bdr.mst REF 2: REF 3:
PLOT SCALE: 0.083334:1
USER: dkreiden DATE: 18-MAY-2006 13:37 FILE: \\WWTP_2D\data\data\drafters\SD\sd266\sd266m001.dgn

HVAC SYMBOLS AND LEGEND

- 40x12 — SHEET METAL DUCT (1ST FIGURE, INSIDE WIDTH; 2ND FIGURE, INSIDE DEPTH)
- 20x12 — SHEET METAL DUCT WITH INTERNAL INSULATION (DIMENSION SHOWN IS NET INSIDE)
- ARROW INDICATES DIRECTION OF AIR FLOW IN DUCT
- (16x12) — HIDDEN SHEET METAL DUCT (1ST FIGURE, INSIDE WIDTH; 2ND FIGURE, INSIDE DEPTH)
- SUPPLY DUCT SECTION UP
- RETURN DUCT SECTION DOWN
- EXHAUST DUCT SECTION UP
- SUPPLY DUCT SECTION DOWN
- RETURN DUCT SECTION UP
- EXHAUST DUCT SECTION DOWN
- ROUND ELBOW UP
- ROUND ELBOW DOWN
- TV — TURNING VANES
- TURNING VANES (SMOOTH RADIUS)
- TAKE-OFF WITH ADJUSTABLE TURNING VANES
- AD — ACCESS DOOR
- AP — ACCESS PANEL
- VD — VOLUME DAMPER WITH LOCKING QUADRANT
- M — MOTORIZED DAMPER
- DUCT TRANSFORMATION, MAXIMUM 15° INCLUDED ANGLE EXCEPT WHERE SHOWN OTHERWISE
- FDC — FLEXIBLE DUCT CONNECTION
- 400 / 12x12x1 (XX) — CEILING SUPPLY DIFFUSER
- 200 / 10x10 (XX) — CEILING RETURN REGISTER
- 200 / 10x10 (XX) — EXHAUST REGISTER
- 200 / 10x10 (XX) — SIDEWALL RETURN OR EXHAUST REGISTER
- 200 / 10x10 (XX) — SIDEWALL SUPPLY REGISTER

  TOP FIGURE INDICATES CFM
  ARROW INDICATES FLOW DIRECTION
  BOTTOM FIGURE INDICATES NECK, DIFFUSER, REGISTER, OR GRILLE SIZE
  TEXT IN CIRCLE INDICATES REGISTER DESIGNATION

- 9x9 / 9"ø — RECTANGULAR TO ROUND DUCT TRANSFORMATION
- FLEXIBLE DUCT (6'-0" MAXIMUM LENGTH)
- FDR — FIRE DAMPER
- DL / CFM | WxH — DOOR LOUVER
- (T) W25-EF-302-00 — ROOM THERMOSTAT & EQUIPMENT NUMBER (SEE EQUIPMENT SCHEDULES)
- CENTRIFUGAL FAN
- INLINE AXIAL FAN, BELT DRIVEN
- WALL MOUNTED AXIAL FAN AND BOOT
- VANE AXIAL FAN
- PROPELLER FAN
- OFM — ORIFICE FLOW METER
- VFM — VENTURI FLOW METER
- FILTER
- PARALLEL BLADE DAMPER
- OPPOSED BLADE DAMPER
- (SP) — STATIC PRESSURE SENSOR
- (SD) — SMOKE DETECTOR
- POWER OR GRAVITY ROOF VENTILATOR (EXHAUST)

HVAC ABBREVIATIONS

AL	ACOUSTIC LINED
DB	DRY BULB
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SEN MBH	SENSIBLE 1000 BTU PER HOUR
TSP	TOTAL STATIC PRESSURE

HVAC NOTES

1. ABBREVIATIONS SHOWN HERE SUPERCEDE THOSE FOUND ON DRAWINGS STD-G-002 AND STD-G-003.
2. DUCTING DESIGNATIONS SHOWN ON THE DRAWINGS ARE SIMILAR TO DEFINED PIPING SYSTEM ON DRAWING STD-M-001.

REF 7: REF 8: REF 9:
REF 4: REF 5: REF 6:
REF 1: sd266bdr.mst REF 2: REF 3:
PLOT SCALE: 0.083334:1
USER: dkreiden DATE: 10-MAY-2006 13:37 FILE: \\WWTP-01\data\data\drafters\SD\sd266\sd266m002_r00

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NO.	DATE	REVISION	BY	REC.	APP.

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

MECHANICAL

HVAC SYMBOLS, LEGEND, ABBREVIATIONS AND GENERAL NOTES

SHEET NO. 39

SCALE NONE
DATE MAY 2006

SD266-M-002 — DRAWING NUMBER — Ø REV.

REGISTERED PROFESSIONAL ENGINEER — JOHN DEAN WARREN — No. C65259 — Exp. 09/30/07 — CIVIL — STATE OF CALIFORNIA
5/25/06

PIPING SCHEDULE

SERVICE	SYMBOL	LOCATION	SIZE (NOTE 1)	PIPING MATERIAL (NOTE 3)	SPECIFICATION NO.	INSTALLATION	LINING/COATING (NOTE 2)	TEST PRESSURE (PSIG/MEDIUM)	REMARKS
CENTRATE/FILTRATE	CENT/FILT	W24 AND W25	8" AND LARGER	STEEL	15230	EXPOSED	GLASS-LINED	15/WATER	MANUAL VALVES SHALL BE GLASS-LINED PLUG VALVES.
POTABLE WATER	1W	W30	1/2" AND LARGER	PVC, SCH 80	15230	EXPOSED	-	100/WATER	PROVIDE TRANSITIONS FOR TIE-IN WITH EXISTING COPPER PIPE.
PROCESS WATER	2W	W30	1/2" AND LARGER	PVC, SCH 80	15230	EXPOSED	-	100/WATER	
INSTRUMENT AIR	IA	W30	1/2" AND LARGER	STEEL, WELDED	15230	EXPOSED	-	50/AIR	
SODIUM HYPOCHLORITE (~12 TO 15% SOLN)	SHC	W30	1/2" AND LARGER	CPVC, SCH 80	15230	EXPOSED	-	100/WATER	PROVIDE DOUBLE CONTAINMENT.
CHEMICAL SOLUTION (SODIUM HYPOCHLORITE <12% SOLN)	CS	W30	1/2" AND LARGER	CPVC, SCH 80	15230	EXPOSED	-	100/WATER	PROVIDE DOUBLE CONTAINMENT.
DRAINS	DR	W30	1/2" AND LARGER	PVC, SCH 80	15230	EXPOSED/BURIED	-	15/WATER	EXCEPT IN CHEMICAL SERVICES, DRAIN TO BE CPVC.
FOUL AIR	FA	W30	4" TO 8"	PVC, SCH 40	15230	EXPOSED	-	PER SPEC 15814	
FOUL AIR	FA	W30	8" AND LARGER	FRP	15814	EXPOSED	-	PER SPEC 15814	
SUPPLY AIR	SUP	W30	8" AND LARGER	FRP	15814	EXPOSED	-	PER SPEC 15814	
EXHAUST AIR	EXH	W30	8" AND LARGER	FRP	15814	EXPOSED	-	PER SPEC 15814	

NOTES FOR PIPING SCHEDULE:

1. PIPE SIZES FOR EACH SYSTEM, OR SERVICE, ARE SHOWN ON THE DRAWINGS.
2. EXPOSED PIPING SHALL BE PAINTED FOR CORROSION AND IDENTIFICATION PER SPECIFICATION SECTION 09900.
3. SPECIFIC MATERIAL CALL OUT FOR ANY PIPE SIZE AND VALVE TYPE/MATERIAL CALL OUT ON DRAWINGS SHALL SUPERSEDE THIS SCHEDULE.
4. SPECIFIC MATERIAL CALL OUT FOR ANY PIPE SIZE AND VALVE TYPE ON DRAWINGS SHALL SUPERSEDE THIS SCHEDULE.

SUPPLY FAN SCHEDULE - WAS THICKENING STATION

EQUIPMENT NO.		LOCATION	AREA SERVED	TYPE	FAN CAPACITY			MOTOR				REMARKS
EXISTING	REPLACED/NEW				CFM	RPM	ESP IN H20	HP	VOLT	PH	RPM	
W-30-FAN-SUP-01	W30-SUP-FAN-01	FIRST FLOOR, WALL MOUNTED	FIRST FLOOR	AXIAL	4100	1750	0.125	0.75	460	3	1750	
W-30-FAN-SUP-02	W30-SUP-FAN-02	FIRST FLOOR, WALL MOUNTED	FIRST FLOOR	AXIAL	4100	1750	0.125	0.75	460	3	1750	
W-30-FAN-SUP-03	W30-SUP-FAN-03	ROOF	SECOND FLOOR	VANEAXIAL	13000	1921	1.75	10	460	3	1800	RELOCATED TO ROOF
W-30-FAN-SUP-04	W30-SUP-FAN-04	FIRST FLOOR, WALL MOUNTED	FIRST FLOOR	AXIAL	4100	1750	0.125	0.75	460	3	1750	
W-30-FAN-SUP-05	W30-SUP-FAN-05	ROOF	SECOND FLOOR	VANEAXIAL	13000	1921	1.75	10	460	3	1800	RELOCATED TO ROOF
W-30-FAN-SUP-06	W30-SUP-FAN-06	FIRST FLOOR, WALL MOUNTED	FIRST FLOOR	AXIAL	4100	1750	0.125	0.75	460	3	1750	
W-30-FAN-SUP-07	W30-SUP-FAN-07	FIRST FLOOR, WALL MOUNTED	FIRST FLOOR	AXIAL	4100	1750	0.125	0.75	460	3	1750	

EXHAUST FAN SCHEDULE - WAS THICKENING STATION

EQUIPMENT NO.		LOCATION	AREA SERVED	TYPE	FAN CAPACITY			MOTOR				REMARKS
EXISTING	REPLACED/NEW				CFM	RPM	ESP IN H20	HP	VOLT	PH	RPM	
W-30-EF-301-00	W30-FA-FAN-01	WEST ODOR SCRUBBER	DEWATERING	CENTRIFUGAL	6000	2464	14	25	460	3	1800	NEC, CLASS 1, DIV. 2 SERVICE
W-30-EF-302-00	W30-FA-FAN-02	EAST ODOR SCRUBBER	THICKENING	CENTRIFUGAL	6000	2464	14	25	460	3	1800	NEC, CLASS 1, DIV. 2 SERVICE

AIR CONDITIONING UNIT SCHEDULE - WAS THICKENING STATION

EQUIPMENT NO.		LOCATION	AREA SERVED	DESIGN CRITERIA							
EXISTING	REPLACED/NEW			FLOWRATE CFM	PRESSURE IN H20	COOLING TONS	NET COOLING MBH	SEER	ELECTRICAL		
									VOLTS	PHASE	HZ
W-30-AHU-001-01	W30-HVAC-AHU-01	ROOF THICKENING	OFFICE/ELECTRICAL ROOM	800	0.35	2	24	13	208	1	60

GENERAL NOTES:

1. PROVIDE NEW EQUIPMENT TAGS WITH REVISED NUMBERS SHOWN IN COLUMN "REPLACED/NEW" IN ABOVE SCHEDULES. TAGS SHALL REPLACE ALL EXISTING TAGS FOR SPECIFIED EQUIPMENT, INCLUDING BUT NOT LIMITED TO, MCC BUCKET, LCP, LOCAL START/STOP, ETC. SEE DWG STD-G-005 FOR ADDITIONAL INFORMATION.

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

REGISTERED PROFESSIONAL ENGINEER
CHERN-DEAN CHEN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA
5/25/06

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

MECHANICAL

PIPING AND HVAC SCHEDULES

SHEET NO. 40

SCALE	NONE	SD266-M-330	0
DATE	MAY 2006	DRAWING NUMBER	REV.

REF 7: REF 8: REF 9:
REF 4: REF 5: REF 6:
REF 1: sd266bdr.mst REF 2: REF 3:
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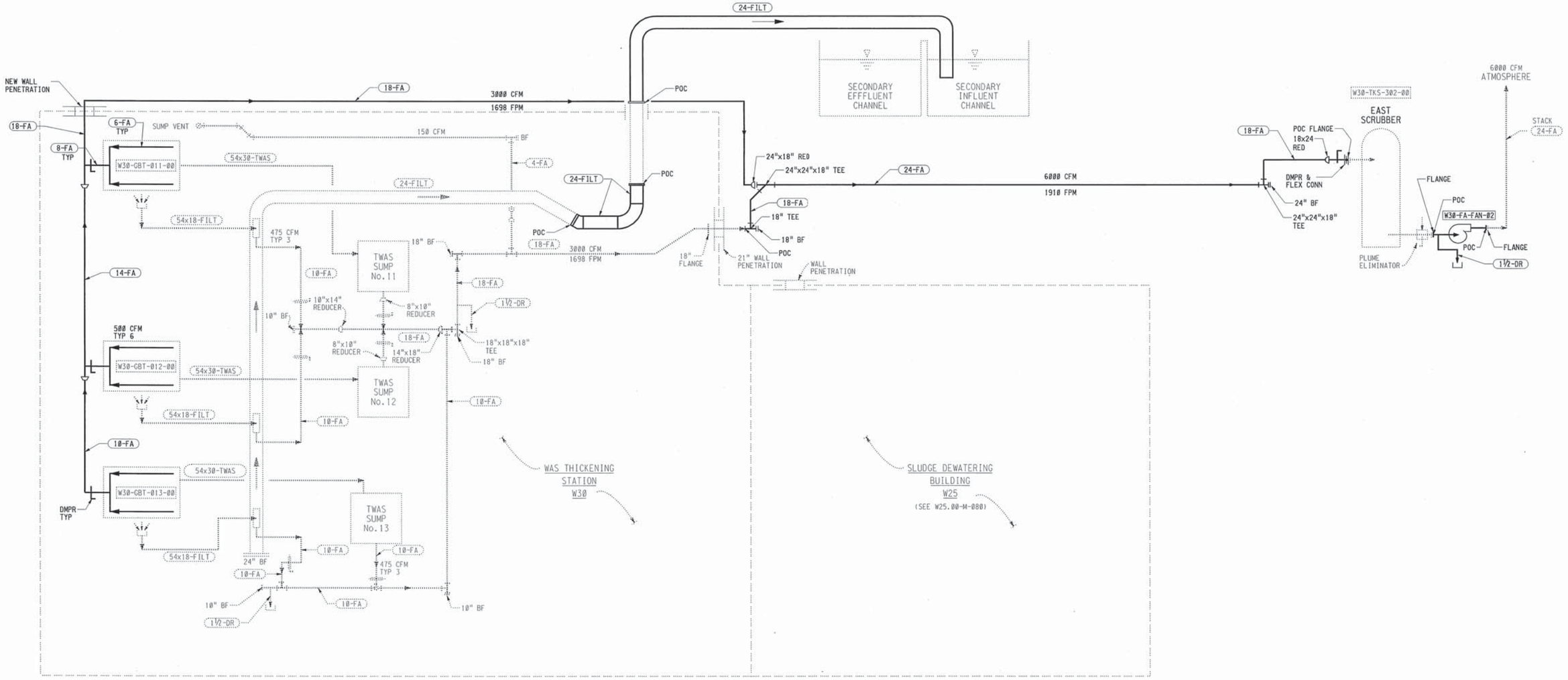

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PLOT SCALE: 0.083334

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NO.	DATE	REVISION	BY	REC.	APP.

REGISTERED PROFESSIONAL ENGINEER
GREIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA
5/25/06

SD266 – CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	R. ATENDIDO / DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
WAS THICKENING STATION
MECHANICAL
FOUL AIR SYSTEM FLOW SCHEMATIC

SHEET NO. 78

SCALE	DRAWING NUMBER	REV.
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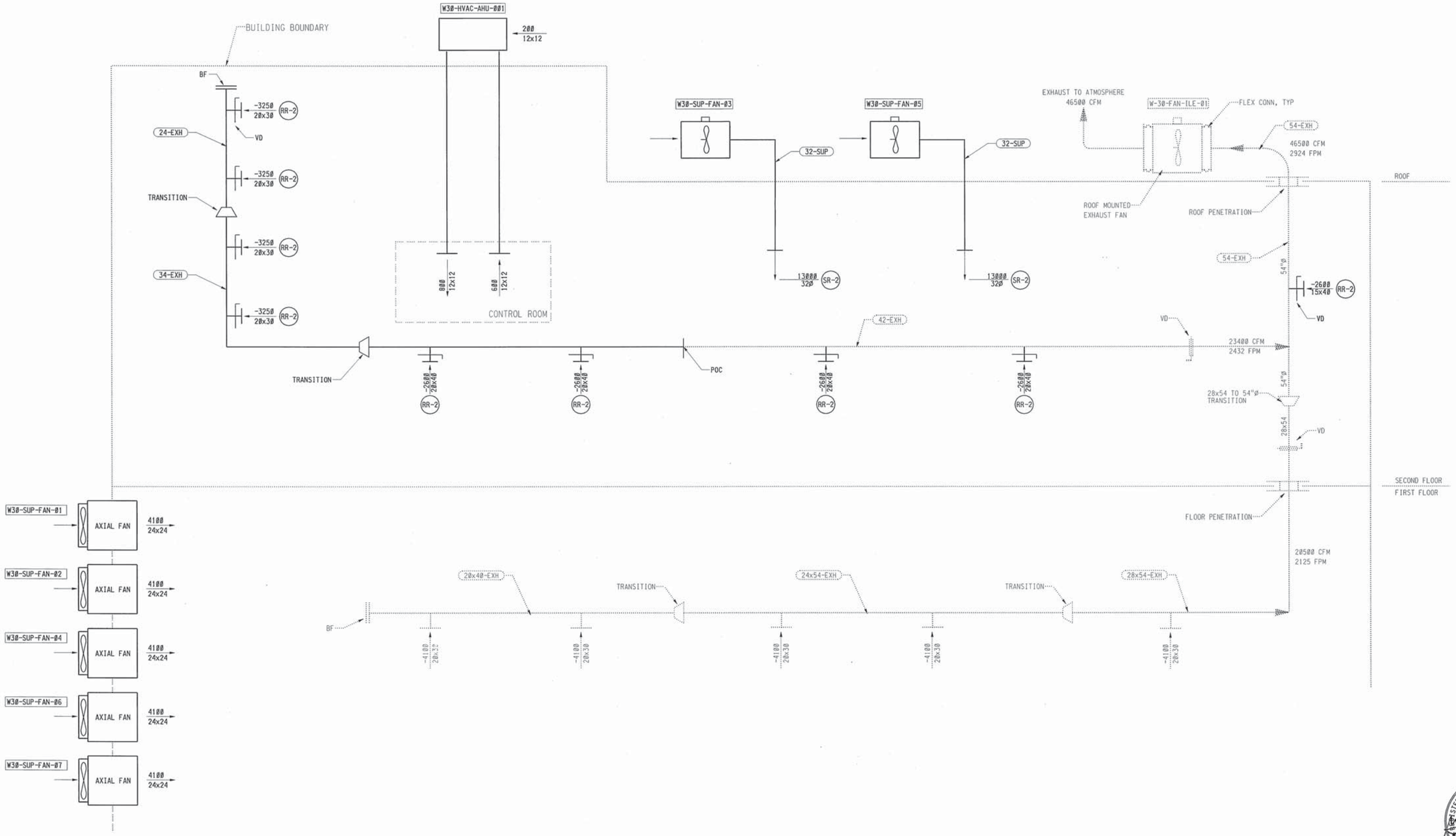
DATE MAY 2006		



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PLOT SCALE: 0.0033341

3" ON ORIGINAL DOCUMENT
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NO.	DATE	REVISION	BY	REC.	APP.

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA
5/25/06

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

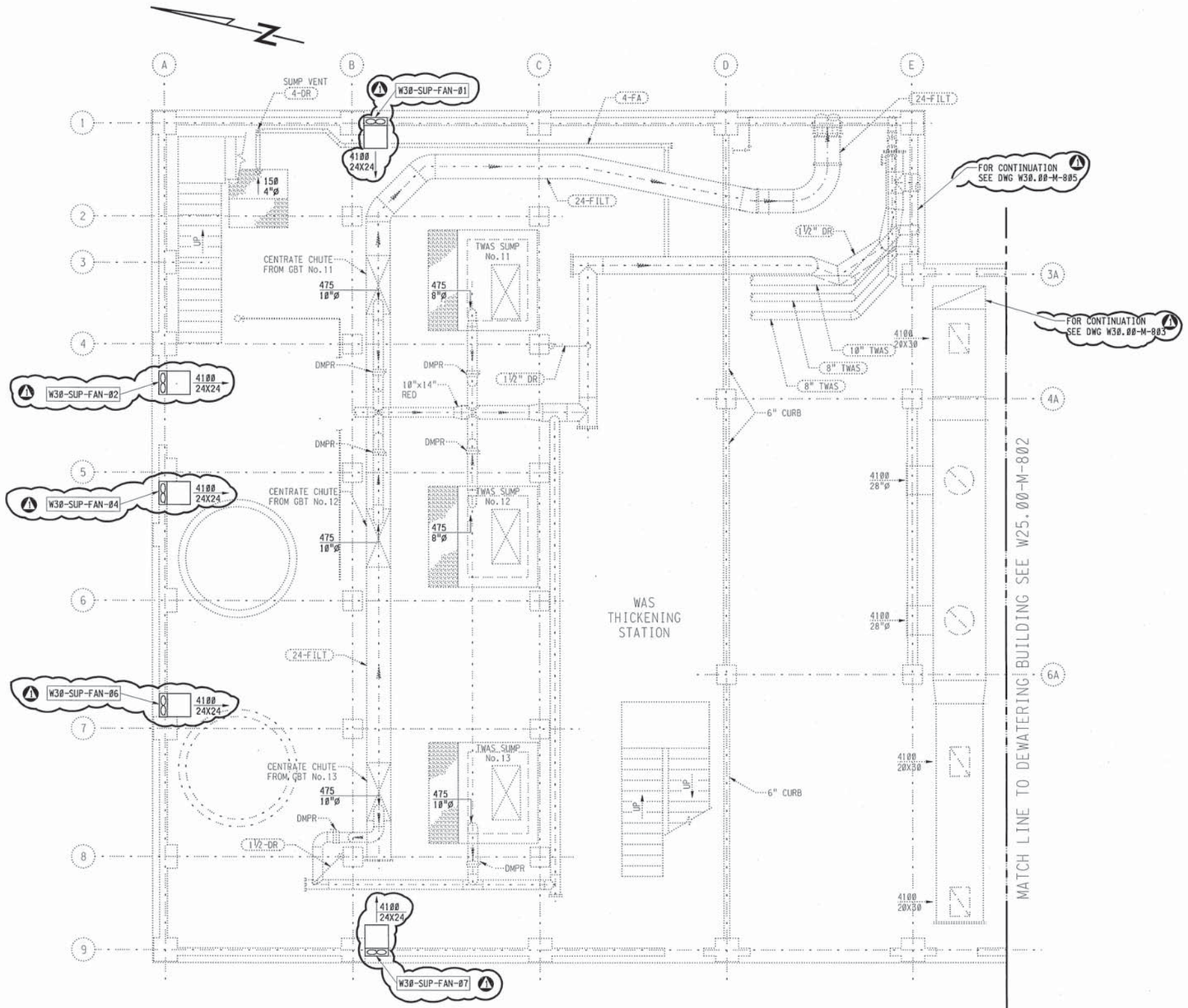
DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	R. ATENDIDO / DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496		T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
WAS THICKENING STATION
MECHANICAL
VENTILATION SYSTEM FLOW SCHEMATIC

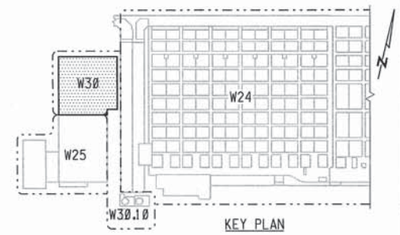
SHEET NO. 71

SCALE	NONE	W30.00-M-081	0
DATE	MAY 2006	DRAWING NUMBER	REV.



FIRST FLOOR PLAN

3/16 "=1'-0"



KEY PLAN

REGISTERED PROFESSIONAL ENGINEER
GORIN DEAN WILSON
C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA
5/25/06

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0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
0	05MAY2006	REVISED PER SD266 & DRAWING RENUMBERED			

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

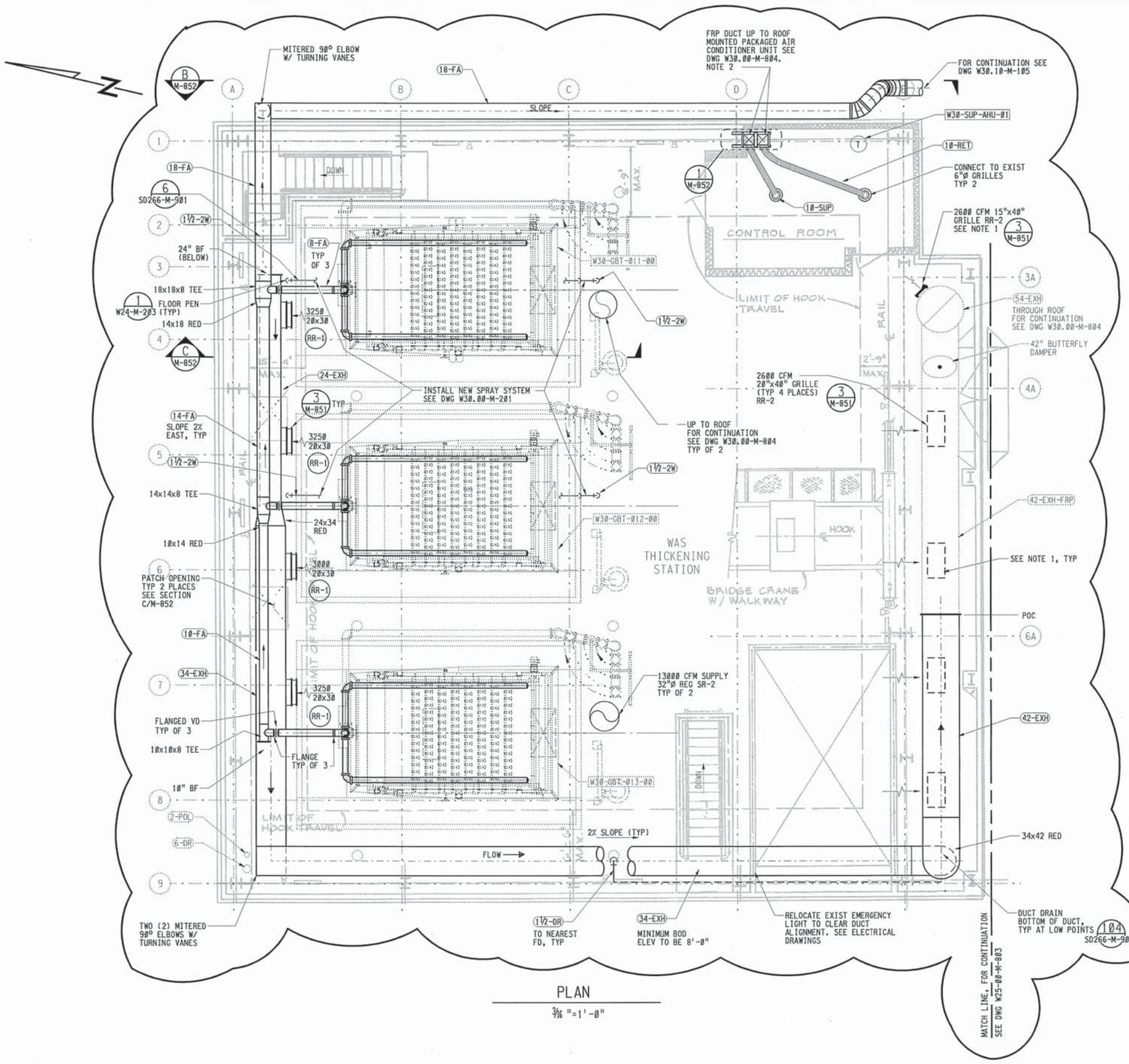
DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
WAS THICKENING STATION
MECHANICAL
HVAC FIRST FLOOR PLAN

SHEET NO. 74

SCALE	3/16 "=1'-0"	W30.00-M-802	1
DATE	MAY 2006	DRAWING NUMBER	REV.

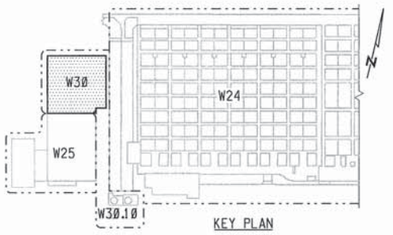


PLAN

3/16 "=1'-0"

NOTES

1. MOUNT GRILLES ON EXIST FRP DUCT, SIMILAR TO DETAIL 3/M-851.
2. ROUTE DUCTING AS NOT TO INTERFERE WITH CRANE RAIL AND TRAVEL. PROVIDE NEW HANGERS AND SUPPORTS.
3. ALL REQUIRED DUCT SUPPORTS AND SEISMIC BRACING ON THIS DRAWING SHALL BE DESIGNED BY THE CONTRACTOR IN ACCORDANCE WITH SPECIFICATION SECTION 15060.



REGISTERED PROFESSIONAL ENGINEER
GRAIN DEAN WEBER
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA
5/25/06

NO.	DATE	REVISION	BY	REC.	APP.
1	05MAY2006	REVISED PER SD266			

3" ON ORIGINAL DOCUMENT

0 1 2 3

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
WAS THICKENING STATION
MECHANICAL
HVAC SECOND FLOOR PLAN

SHEET NO. 75

SCALE 3/16 "=1'-0" | DATE MAY 2006 | W30.00-M-803 DRAWING NUMBER | 1 REV.

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REF 3: a2000mfr2.mst
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USER: dkreiden
DATE: 18-MAY-2006 13:54
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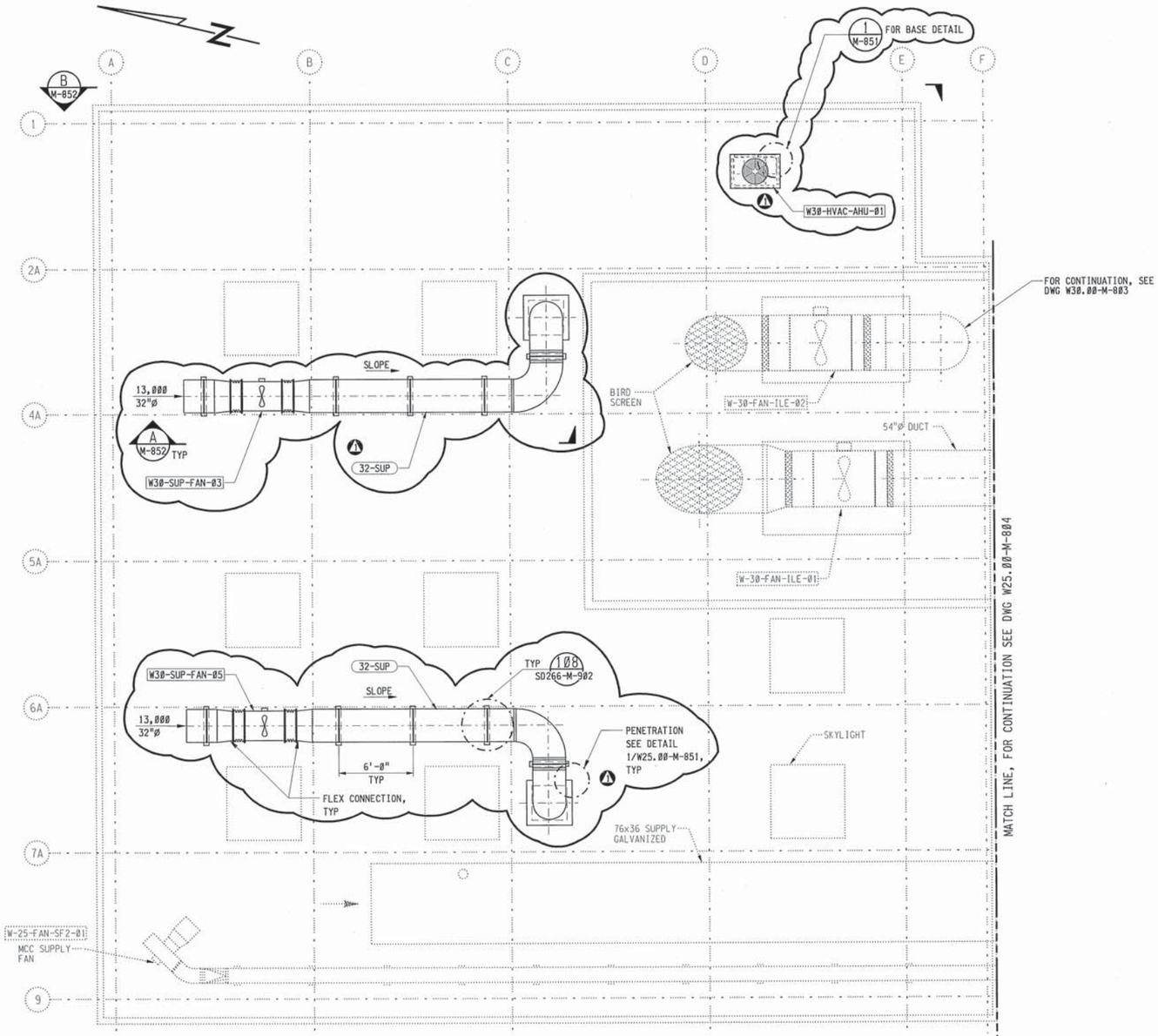
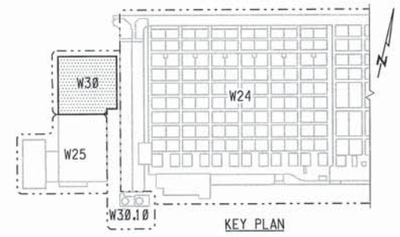


ROOF PLAN

3/16 "=1'-0"



REGISTERED PROFESSIONAL ENGINEER
GALIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

5/25/06

NO.	DATE	REVISION	BY	REC.	APP.
05	05MAY2006	REVISED PER SD266			

3" ON ORIGINAL DOCUMENT

0 1 2 3

SD266 - CENTRIFUGE AND ODOR CONTROL SYSTEM IMPROVEMENTS

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	K. ENG / O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E.No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E.No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E.No.	R. RUIZ / J. TRAN
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
WAS THICKENING STATION
MECHANICAL
HVAC ROOF PLAN

SHEET NO. 76

SCALE 3/16 "=1'-0" | DATE MAY 2006 | W30.00-M-804 DRAWING NUMBER | 1 REV.

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PLOT SCALE: 5.333353

EAST BAY MUNICIPAL UTILITY DISTRICT

SPECIAL DISTRICT NO. 1

Oakland, California

RECORD DRAWINGS

EBMUD

MAIN WASTEWATER TREATMENT PLANT CENTRIFUGE ADDITION PROJECT

SD-288

January 2007

Volume III Drawings

A COPY OF THE ORIGINAL DRAWING WITH ORIGINAL SIGNATURES CAN BE FOUND IN WASTEWATER DRAFTING

Recommended

Edward H. McCormick
Mgr. of Support Services
R.P.E. No. C 33317

Approved

David R. Williams
Director of Wastewater
R.P.E. No. C 25942

USER: dmamangu
DATE: 29-JUN-2009 14:01
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USER: dmonarrp
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PLOT SCALE: 0.166667:1

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3	SD288-G-003	ABBREVIATIONS FOR WASTEWATER FACILITIES, A THRU M
4	SD288-G-004	ABBREVIATIONS FOR WASTEWATER FACILITIES, N THRU Z
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150	W21.00-S-202	STRUCTURAL, WEST GALLERY * SOUTH END, SECTIONS AND DETAILS
151	W21.00-M-201	MECHANICAL, WEST GALLERY *NORTH END, SUMP PUMP SECTIONS AND DETAILS
152	W21.00-E-101	ELECTRICAL, WEST GALLERY DRAIN REPAIR, POWER PLAN
153	W21.00-E-301	ELECTRICAL, GALLERY SUMP PUMP, CONTROL DIAGRAM

GENERAL NOTES

1. ITEMS SHOWN IN BLACK/SOLID ON DRAWINGS INDICATE WORK UNDER THIS CONTRACT.
2. GRAY/SCREENED REFERENCES TO OTHER DRAWINGS MAY BE FOUND IN THE ORIGINAL CONTRACT DOCUMENTS.
3. NOT ALL EXISTING UTILITIES, WHICH MAY INTERFERE WITH NEW WORK, ARE SHOWN ON THE DRAWINGS.
4. PROJECT DRAWING NUMBERS ARE DEFINED AS FOLLOWS:
   AAA.BB-C-XXX.D WHERE:
   - AAA = AREA CODE (3-DIGIT ALPHA/NUMERIC NUMBER FOR EACH FACILITY OR AREA)
   - BB = SUBSTRUCTURE NUMBER (NUMBER FOR EACH STRUCTURE WITHIN FACILITY OR AREA)
   - C = DISCIPLINE CODE LETTER
     - A - ARCHITECTURAL
     - C - CIVIL
     - E - ELECTRICAL
     - G - GENERAL
     - I - INSTRUMENTATION (P&ID)
     - L - LANDSCAPE
     - M - MECHANICAL
     - S - STRUCTURAL
   - XXX = SERIAL NUMBER (MAY INCLUDE A DECIMAL AND/OR LETTER SUFFIX)
     - D - DEMOLITION DRAWING (OMITTED WHEN NOT USED)
5. AREA CODES AND SUBSTRUCTURE NUMBERS ARE DEFINED AS FOLLOWS:
   - SD288 - MULTIPLE PROJECT AREAS
   - WWP - WASTEWATER TREATMENT PLANT
   - W20.00 - ROADS AND FENCES
   - W24.00 - PRIMARY SEDIMENTATION TANKS
   - W25.00 - SLUDGE DEWATERING BUILDING
   - W25.10 - SLUDGE DEWATERING BUILDING (WEST HOPPER AREA)
   - W30.00 - WAS THICKENING STATION

   SEE DRAWING SD288-G-006 FOR DETAILS.
6. IF A CALL-OUT REFERENCES A DRAWING WITH THE SAME AREA CODE AND SUBSTRUCTURE NUMBER, THE AREA CODE AND SUBSTRUCTURE NUMBER WILL NOT BE SHOWN. ONLY THE DISCIPLINE CODE AND SERIAL NUMBER ARE SHOWN.

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
A	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			
A	13JUN2007	CONFORMED DRAWING	GDW	GDW	EHM
A	08MAR2007	ADDENDUM NO. 2 FOR SD288	GDW	TNC	EHM

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

GENERAL

INDEX OF DRAWINGS AND GENERAL NOTES

SHEET NO. 1

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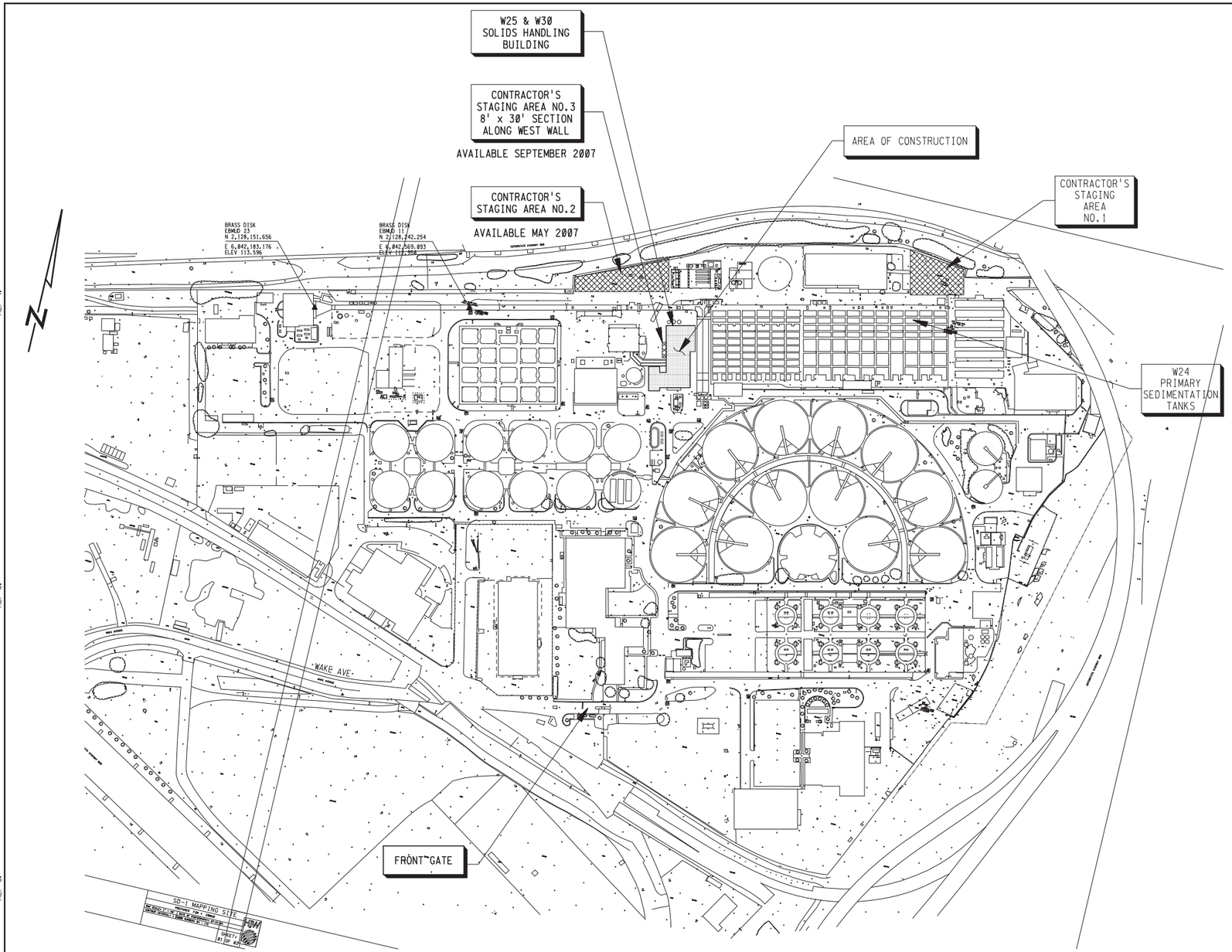
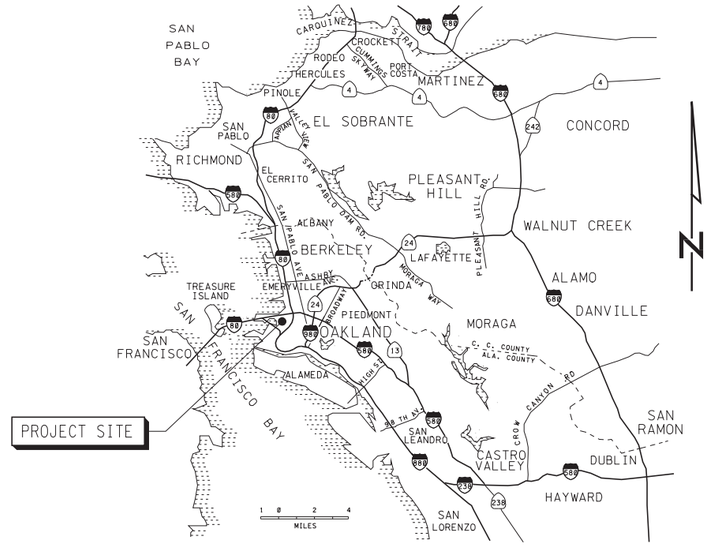
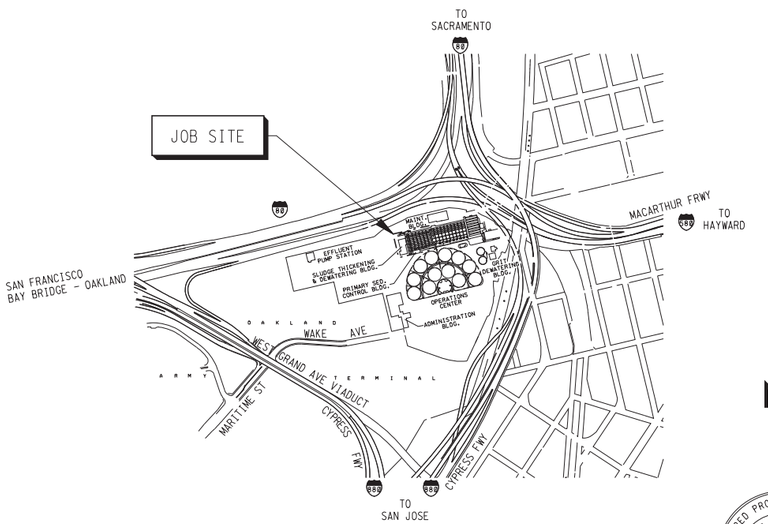
DATE	JANUARY 2007	DRAWING NUMBER	REV.



SITE MAP



LOCATION MAP



VICINITY MAP

NOTE:

SEE DRAWING W20.00-C-113.3 FOR LOCATION OF TEMPORARY DEWATERING FACILITY STAGING AREA (BY OTHERS).

CONTRACTOR'S STAGING AREA NO. 1 WILL ONLY BE AVAILABLE UNTIL APRIL 1, 2008.

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
2	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			
1	13JUN2007	CONFORMED DRAWING	BPW	BPW	TNC

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ / J. TRAN
	DRAWN BY:	A. MUNOZ
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

GENERAL

SITE MAP, LOCATION MAP AND VICINITY MAP

SHEET NO. 2

SCALE	NONE	SD288-G-002	2
DATE	JANUARY 2007	DRAWING NUMBER	REV.

REGISTERED PROFESSIONAL ENGINEER
GRAIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

REF 7:
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REF 3:

USER: dmanogu
DATE: 24JAN2007 14:02
FILE: J:\SD\sd288\sd288g003.R01

PLOT SCALE: 0.166667:1

A

A	AMBER, AMMETER, AUTOMATIC
AB	ANCHOR BOLT
ABAND	ABANDONED
ABC	AGGREGATE BASE COURSE
ABS	ABSOLUTE
ABV	ABOVE
AC	AIR CONDITIONING, ALTERNATING CURRENT, ASPHALTIC CONCRETE
ACC	AREA CONTROL CENTER
ACI	AMERICAN CONCRETE INSTITUTE
ACK	ACKNOWLEDGE
ACST	ACOUSTIC
ADD	ADDITION
ADJ	ADJACENT, ADJUST
ADPTR	ADAPTER
AF	AIR FILTER, AMPERE FRAME
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AGG	AGGREGATE
AI	ANALOG INPUT
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AIT	ANALYTICAL INDICATOR TRANSMITTER
AL	ALUMINUM, ACOUSTIC LINED
ALLOW	ALLOWANCE
ALM	ALARM
ALT	ALTERNATE
AM	AUTO-MANUAL
AMB	AMBIENT
AMP	AMPERES
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
AO	ANALOG OUTPUT
AP	ACCESS PANEL
APP	APPLIED
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AS	ADJUSTABLE SWITCH, AIR SUPPLY, AMMETER SWITCH, AMPERE SENSOR
ASB	ASBESTOS
ASC	ADJUSTABLE SPEED CONTROLLER
ASPH	ASPHALT
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AT	AMPERE TRIP
ATM	ATMOSPHERE
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
AWG	AMERICAN WIRE GAUGE
AWS	AMERICAN WELDING SOCIETY
AWWA	AMERICAN WATER WORKS ASSOCIATION

B

B	BELL, BLUE
BB	BOTTOM BAR
BBH	BASEBOARD HEATER
B/C	BOTTOM OF CONCRETE
BC	BARE COPPER, BEGINNING OF CURVE, BOLT CIRCLE
B/D	BOTTOM OF DUCT
BD	BOARD
BDD	BACKDRAFT DAMPER
BF	BLIND FLANGE
BFP	BACKFLOW PREVENTER
BFV	BUTTERFLY VALVE
BG	BELOW GRADE
BHP	BRAKE HORSEPOWER
BITUM	BITUMINOUS
BKR	BREAKER
BLDG	BUILDING
BLK	BLOCK, BLACK
BLKG	BLOCKING
BLT	BOLT
BLU	BLUE
BLV	BALL VALVE
BM	BEAM, BENCHMARK
BO	BLOWOFF
BOT	BOTTOM
B/P	BOTTOM OF PIPE
BP	BYPASS
BRG	BEARING

B (CONTINUED)

BRK	BREAK
BRN	BROWN
BRZ	BRONZE
B&S	BELL & SPIGOT
BS	BOTH SIDES
BSHG	BUSHING
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
BV	BALL VALVE
BVC	BEGINNING OF VERTICAL CURVE
BTWN	BETWEEN

C

C	CABLE, CENTIGRADE, CLOSE, CONDUIT, STRUCTURAL STEEL CHANNEL
CAB	CABINET
CALIB	CALIBRATE
CAP	CAPACITY
CAT	CATALOG
CB	CATCH BASIN, CIRCUIT BREAKER
CC	CONTROL CABLE, COOLING COIL, CURB COCK
C-C	CENTER TO CENTER
CD	CEILING DIFFUSER, CENTER DISTANCE
CDF	CONTROLLED DENSITY FILL
CEM	CEMENT
CER	CERAMIC
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CG	CEILING GRILLE
CHAM	CHAMFER
CHEM	CHEMICAL
CI	CAST IRON
CIMJ	CAST IRON MECHANICAL JOINT
CIP	CAST-IN-PLACE
CIR	CIRCLE
CIRC	CIRCULAR
CJ	CONSTRUCTION JOINT
CKT	CIRCUIT
CKV	CHECK VALVE
CL	CLASS, CONTROL LOOP, CLOSE
CL2	CHLORINE
CLT	CURRENT LIMITING
CLG	CEILING
CLJ	CONTROL JOINT
CLKG	CAULKING
CLO	CLOSET
CLR	CLEAR, CLEARANCE
CMU	CONCRETE MASONRY UNIT
CNDCT	CONDUCTIVITY
CNTL	CONTROL
CNTLR	CONTROLLER
CNTR	COUNTER
CNTOR	CONTACTOR
CO	CLEANOUT, CONTROL OUTPUT, COMPANY
CO2	CARBON DIOXIDE
COAX	COAXIAL
COL	COLUMN
COM	COMMON
COMP	COMPACTION
COMPT	COMPARTMENT
CON	CONCENTRIC
CONC	CONCRETE
COND	CONDUCTIVITY
CONF	CONFERENCE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS, CONTINUATION
CONTD	CONTINUED
COORD	COORDINATE
COP	COPPER PIPE
CORR	CORRUGATED
COTG	CLEANOUT TO GRADE
CP	CONTROL POINT
CPS	CATHODIC PROTECTION STATION
CPT	CONTROL POWER TRANSFORMER
CR	CEILING REGISTER, CONTROL RELAY
CRE	CORROSION RESISTANT
CRG	CARRIAGE
CRS	COATED RIGID STEEL CONDUIT, COLD ROLL STEEL

C (CONTINUED)

CS	CONTROL STATION, CONTROL SWITCH, CUP SINK
CT	CONDUIT, COURT, CURRENT TRANSFORMER
CTD	CENTERED
CTR	CENTER
CU FT	CUBIC FOOT
CU IN	CUBIC INCH
CU YD	CUBIC YARD
CV	CONTROL VALVE
CW	COLD WATER, CLEAR WELL

D

d	PENNY (NAIL SIZE)
D	DEPTH, DIMMER, DISCHARGE
DB	DECIBEL, DRY BULB
DBL	DOUBLE
DC	DIRECT CURRENT
DCS	DISTRIBUTED CONTROL SYSTEM
DECR	DECREASING
DEG	DEGREES
DEPT	DEPARTMENT
DESC	DESCRIPTION
DET	DETAIL
DF	DOUGLAS FIR
DF/L	DOUGLAS FIR/LARCH
DI	DIGITAL INPUT, DROP INLET
DIA	DIAMETER
DIAG	DIAGRAM, DIAGONAL
DIFF	DIFFERENCE, DELTA
DIMJ	DUCTILE IRON MECHANICAL JOINT
DIM	DIMENSION
DISC	DISCONNECT
DISCH	DISCHARGE
DISP	DISPENSER
DIV	DIVISION
DL	DAYLIGHT, DOOR LOUVER, DISCRETE LATCHED OUTPUT
DMV	DIAPHRAGM VALVE
DN	DOWN
DO	DIGITAL OUTPUT, DITTO
DP	DEEP, DISCHARGE PRESSURE, DIFFERENTIAL PRESSURE
DPDT	DOUBLE POLE DOUBLE THROW
DR	DRAIN, DOOR, DRIVE
DS	DOWNSPOUT
DWG	DRAWING
DWL	DOWEL
DWV	DRAIN WASTE VENT
DWY	DRIVEWAY

E

E	EAST
(E)	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EBMUD	EAST BAY MUNICIPAL UTILITY DISTRICT
EC	END OF CURVE
ECC	ECCENTRIC
EE	EMERGENCY EYEWASH
E/E	VOLTAGE-TO-VOLTAGE
EF	EACH FACE, EXHAUST FAN
EFF	EFFICIENCY
EFL	EFFLUENT
E/I	VOLTAGE-TO-CURRENT
EJ	EXPANSION JOINT
EL	ELEVATION (NUMERIC)
ELEC	ELECTRICAL
ELEV	ELEVATION (VIEW), ELEVATOR
ELB	ELBOW
EMBED	EMBEDMENT
EMER	EMERGENCY
EMTY	EMPTY
ENCL	ENCLOSURE
ENG	ENGINE
ENGR	ENGINEER
EO	ELECTRIC OPERATOR
EP	EDGE OF PAVEMENT
EPV	ECCENTRIC PLUG VALVE
EQ	EQUAL
EQPT	EQUIPMENT

E (CONTINUED)

EQUIV	EQUIVALENT
ESP	EXTERNAL STATIC PRESSURE
EST	ESTIMATE
ETM	ELAPSED TIME METER
ETW	EDGE OF TRAVELLED WAY
EVC	END OF VERT CURVE
EW	EACH WAY
EWC	ELECTRIC WATER HEATER
EX	EXAMPLE, EXTRA
EXH	EXHAUST
EXP	EXPANSION, EXPOSED
EXIST	EXISTING
EXT	EXTERIOR
EXTR	EXTRUDED

F

F	FUSE, FAHRENHEIT
FAB	FABRICATE
FAC	FACTORY
FACIL	FACILITY
FB	FLAT BAR
FC	FACE OF CURB, FLEXIBLE CONNECTION, FLEXIBLE COUPLING, FAIL CLOSED, FERRIC CHLORIDE
FCA	FLANGED COUPLING ADAPTER
FCO	FLOOR CLEANOUT
FD	FIRE DAMPER, FLOOR DRAIN, FOUND
FDBK	FEEDBACK
FDC	FLEXIBLE DUCT CONNECTION
FDR	FEEDER
FF	FINISH FLOOR
F-F	FACE TO FACE
F/F	FACE OF FOOTING
FG	FINISH GRADE
FGL	FIBERGLASS
FH	FIRE HYDRANT, FLAT HEAD
FI	FLOW INDICATOR
FIG	FIGURE
FIN	FINISHED
FIT	FLOW INDICATOR TRANSMITTER
FL	FLASHING, FLOWLINE
FLH	FLATHEAD
FLEX	FLEXIBLE
FLG	FLANGE
FLGD	FLANGED
FLP	FAIL TO LAST POSITION
FLR	FLOOR
FLS	FLOAT SWITCH
FLUOR	FLUORESCENT
FMH	FLEXIBLE METAL HOSE
FND	FOUNDATION
FO	FAIL OPEN
FPM	FEET PER MINUTE
FPRF	FIREPROOF
FPS	FEET PER SECOND
FPT	FEMALE PIPE THREAD
FR	FILTRATION, FLOW RECORDER
FRP	FIBERGLASS REINFORCED PIPE
FS	FAR SIDE, FLOW SWITCH
FT	FOOT, FEET, FLOW TRANSMITTER
FTG	FOOTING
FU	FUSE
FURN	FURNACE
FUT	FUTURE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FXTR	FIXTURE
FW	FACE OF WALL, FILTERED WATER
FWD	FORWARD

G

G	GAS, GREEN
GA	GAUGE OR GAGE
GA/TS	GALVANIC ANODE/TEST STATION
GAL	GALLON
GALV	GALVANIZED
GC	GAS COCK
GDR	GRINDER
GFCI	GROUND-FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
GI	GALVANIZED IRON
GL	GLASS, GLUE LAM
GLV	GLOBE VALVE
GND	GROUND
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRADE
GRV	GROOVED (COUPLING)
GRN	GREEN
GSKT	GASKET
GSM	GALVANIZED SHEET METAL
GSP	GALVANIZED STEEL PIPE
GTV	GATE VALVE
GUT	GUTTER
GWB	GYPSUM WALLBOARD
GYP	GYPSUM

H

H	HEIGHT, HIGH, HAND, HORN, HORIZONTAL
HB	HOSE BIBB
HC	HEATING COIL, HOLLOW CORE
HD	HEAD
HDG	HOT-DIPPED GALVANIZED
HDP	HIGH DISCHARGE PRESSURE
HDR	HEADER
HDWD	HARDWOOD
HDWE	HARDWARE
HESO	HYDRAULIC EMERGENCY SHUTOFF VALVE
HEX	HEXAGONAL
HH	HAND HOLE, HIGH-HIGH
HHWR	HEATING HOT WATER RETURN
HHWS	HEATING HOT WATER SUPPLY
HOA	HAND-OFF-AUTOMATIC
HOR	HAND-OFF-REMOTE
HORIZ	HORIZONTAL
HP	HIGH PRESSURE, HIGH POINT, HORSEPOWER
HR	HOUR, HANDRAIL
HS	HIGH SPEED
HSG	HOUSING
HT	HEAT
HTR	HEATER
HV	HIGH VOLTAGE, HOSE VALVE
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HW	HOT WATER
HWH	HOT WATER HEATER
HWL	HIGH WATER LEVEL
HWR	HOT WATER RETURN
HWY	HIGHWAY
HYDR	HYDRAULIC
HYD	HYDRANT
HZ	HERTZ (CYCLES PER SECOND)

I

IA	INSTRUMENT AIR
IC	INTERRUPTING CAPACITY
ID	IDENTIFICATION, INSIDE DIAMETER
I&C	INSTRUMENTATION & CONTROL
I/E	CURRENT-TO-VOLTAGE
IFC	IN FURRED CEILING
IFS	IN FURRED SPACE
IFW	IN FURRED WALL

I (CONTINUED)

I/I	CURRENT-TO-CURRENT
IJ	INSULATING JOINT
IJS	IN JOIST SPACE
IM	INTRUSION MONITOR
IN	INCH
INCAND	INCANDESCENT
INF	INFLUENT
INS	INSTRUMENTATION
INSUL	INSULATION
INST	INSTANTANEOUS
INT	INTERIOR
INTFC	INTERFACE
INSTR	INSTRUMENT
INTMD	INTERMEDIATE
INTLK	INTERLOCK
INV	INVERT
INV EL	INVERT ELEVATION
I/O	INPUT/OUTPUT
IR	INSIDE RADIUS
IS	INTRUSION SWITCH
IW	IN WALL
IWC	IN WALL CHASE
IWRC	INDEPENDENT WIRE ROPE CORE

J

J	JUNCTION BOX
JB	JUNCTION BOX
JCT	JUNCTION
JP	JOINT POLE
JST	JOIST
JT	JOINT

K

K	KEY, KEY INTERLOCK
KGV	KNIFE GATE VALVE
KIP	THOUSAND POUNDS
KSF	KIPS PER SQUARE FOOT
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
KWHD	KILOWATT HOUR DEMAND METER

L

L	LENGTH, LOW SPEED, LIGHTING CONTRACTOR, LOW
LA	LIGHTNING ARRESTER
LAB	LABORATORY
LAM	LAMINATED
LAV	LAVATORY
LB	POUND
LCP	LOCAL CONTROL PANEL
LDP	LOW DISCHARGE PRESSURE
LF	LINEAR FEET
LI	LEVEL INDICATOR
LIT	LEVEL INDICATOR TRANSMITTER
LL	LOW-LOW
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOA	LENGTH OVERALL
LOC	LOCATION, LOCAL
LONG	LONGITUDINAL
LOS	LOCK OUT STOP PUSHBUTTON
LP	LOW PRESSURE, LOW POINT
LR	LONG RADIUS, LATCHING RELAY, LOCAL-REMOTE
LS	LEVEL SWITCH, LIME SLURRY
LSC	LANDSCAPE

L (CONTINUED)

LSP	LOW SUCTION PRESSURE
LT	LEFT, LIGHT, LEVEL TRANSMITTER
LT FLEX	LIQUID TIGHT FLEXIBLE CONDUIT
LV	LOW VOLTAGE
LTG	LIGHTING
LVL	LEVEL
LVR	LOUVER
LWL	LOW WATER LEVEL
LWR	LOWER

M

M	MOTOR, MAGNETIC CONTACTOR COIL
mA	MILLIAMPERE
MAINT	MAINTENANCE
MAN	MANUAL
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MBH	1000 BTU'S PER HOUR
MBR	MEMBER
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MEMB	MEMBRANE
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MI	MALLEABLE IRON
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MK	MARK
ML&CS	MORTAR LINED & COATED STEEL
MLLW	MEAN LOWER LOW WATER
ML&PCS	MORTAR LINED & PLASTIC COATED STEEL
MLW	MEAN LOW WATER
M-M	MONUMENT TO MONUMENT
MO	MASONRY OPENING, MOTOR OPERATOR
MON	MONUMENT
MORT	MORTAR
MPT	MALE PIPE THREAD
MS	MOTOR STARTER
MSL	MEAN SEA LEVEL
MT	MOUNT
MTD	MOUNTED
MTG	MOUNTING
MTS	MOTOR THERMAL SWITCH
MTRG	METERING
MULT	MULTIPLY
MV	MILLIVOLT
MVA	MEGA-VOLT AMPERE
MW	MICROWAVE, MEGAWATT
MWS	MAXIMUM WATER SURFACE
MWWTP	MAIN WASTEWATER TREATMENT PLANT

NOTES

1. SEE DRAWING SD288-G-004 FOR ABBREVIATIONS N THRU Z, AND FOR SYMBOLS.
2. ABBREVIATIONS OR SYMBOLS SHOWN ON DISCIPLINE SPECIFIC WASTEWATER STANDARD DRAWINGS SHALL TAKE PRECEDENCE OVER ABBREVIATIONS OR SYMBOLS SHOWN ON THIS DRAWING.

REGISTERED PROFESSIONAL ENGINEER
GWAIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
1	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP.: PYL SD288			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
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EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

GENERAL

ABBREVIATIONS FOR WASTEWATER FACILITIES A THRU M

SHEET NO. 3

SCALE	NONE	SD288-G-003	1
DATE	JANUARY 2007	DRAWING NUMBER	REV.

REF 7:
REF 8:
REF 9:

N

N	NEUTRAL, NORTH
(N)	NEW
NA	NOT APPLICABLE, NOT AVAILABLE, NON-AUTOMATIC
NAD	NORTH AMERICAN DATUM
NC	NORMALLY CLOSED
NE	NORTHEAST
NEC	NATIONAL ELECTRICAL CODE
NECY	NECESSARY
NEG	NEGATIVE
NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NO.	NUMBER
NOM	NOMINAL
NOMR	NORMAL
NP	NAMEPLATE
NPS	NOMINAL PIPE SIZE
NPT	NATIONAL PIPE THREAD
NS	NEAR SIDE
NSG	NON-SHRINK GROUT
NTS	NOT TO SCALE
NW	NORTHWEST

O

O3	OZONE
OA	OUTSIDE AIR, OVERALL
OAD	OUTSIDE AIR DAMPER
OAT	OUTSIDE AIR TEMPERATURE
OC	ON CENTER, OPEN-CLOSE
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OHC	OVERHEAD CRANE
OL	OVERLOAD
OO	ON-OFF
OP	OPEN
OP/NET	OPERATIONS NETWORK
OPNG	OPENING
OPP	OPPOSITE
OPS	OPERATION(S)
OR	OUTSIDE RADIUS
ORG	ORANGE
OSD	OPEN SITE DRAIN
OS&Y	OUTSIDE SCREW & YOKE
OVFL	OVERFLOW

REF 4:
REF 5:
REF 6:

P

P	POLE, PILOT
PB	PUSH BUTTON, PULL BOX
PC	POINT OF CURVATURE, PHOTO CELL, POLYMER COAGULANT, PORTLAND CEMENT
PCC	POINT OF COMPOUND CURVE
PDI	PULSE DURATION INPUT
PERF	PERFORATED
PERM	PERMANENT, PERMISSIBLE
PF	POWER FACTOR, PREFILTER
PG&E	PACIFIC GAS & ELECTRIC
PGV	PLUG VALVE
pH	HYDROGEN-ION CONCENTRATION
PH	PHASE, POWER HOUSE
PHC	PREHEAT COIL
PI	POINT OF INTERSECTION, PULSE INPUT, PRESSURE INDICATOR
P&ID	PROCESS & INSTRUMENT DIAGRAM
PK	PEAK
P/L	PROPERTY LINE
PLAS	PLASTER
PLC	PROGRAMMABLE LOGIC CONTROL
PLCS	PLACES
PLSTC	PLASTIC
PLUM	PLUMBING
PLYWD	PLYWOOD
PMP	PUMP
PMPSCT	PUMP SUCTION
PNEU	PNEUMATIC
PNL	PANEL
PO	POLYMER
POC	POINT ON CURVE, POINT OF CONNECTION

P (CONTINUED)

PP	POWER POLE, PUMPING PLANT
PPLN	PIPELINE
PR	PAIR
PRC	POINT OF REVERSE CURVE
PRV	PRESSURE REGULATING VALVE, PRESSURE RELIEF VALVE
PRCST	PRECAST
PREFAB	PREFABRICATED
PRESS	PRESSURE
PRI	PRIMARY
PROP	PROPERTY
PRPSD	PROPOSED
PS	POWER SUPPLY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	PSI (ABSOLUTE)
PSIG	PSI (GAGE)
PT	POINT, POINT OF TANGENCY, POTENTIAL TRANSFORMER
PTN	PARTITION
PTS	POINTS
PV	PROCESS VARIABLE, PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PW	POTABLE COLD WATER
PWH	POTABLE HOT WATER
PWR	POWER

Q

QM	WATER QUALITY
QTY	QUANTITY
QUAL	QUALITY

R

R	RADIAL, RADIUS, RED, RISER, RUN
RA	RETURN AIR
RAD	RADIUS
RC	REINFORCED CONCRETE
RCF	RECIRCULATING FAN
RCP	REINFORCED CONCRETE PIPE
RCCP	REINFORCED CONCRETE CULVERT PIPE
RCVR	RECEIVER
RCVD	RECEIVED
RCPT	RECEPTACLE
RD	ROAD, ROOF DRAIN
RDA	RETURN AIR DAMPER
RDCR	REDUCER
RDL	ROOF DRAIN LEADER
RDWD	REDWOOD
RED	REDUCING, RED
REBAR	REINFORCING BAR
RECT	RECTANGULAR
REF	REFERENCE
REFR	REFRIGERATOR
REINF	REINFORCED, REINFORCEMENT
REL	RELATIVE
REM	REMOVABLE, REMOTE
REQD	REQUIRED
REQT	REQUIREMENT
RESIL	RESILIENT
RESV	RESERVOIR
RET	RETURN (CURB), RETAINING (WALL)
REV	REVERSE, REVISION
REVD	REVISED
RF	RETURN FAN
RGH	ROUGH
RGLTR	REGULATOR
RGS	RIGID GALVANIZED STEEL
RGTR	REGISTER
RH	REHEAT COIL
RI	RODDING INLET
RL	RAIN LEADER
RLA	RATED LOAD AMPS
RLY	RELAY
RM	ROOM, RAPID MIX

R (CONTINUED)

RMS	ROOT MEAN SQUARE
RMT	REMOTE
RMVD	REMOVED
RND	ROUND
RO	ROUGH OPENING
RP	RADIAL POINT
RPM	REVOLUTIONS PER MINUTE
RS	RIGID STEEL CONDUIT
RSP	REMOTE SET (CASCADE)
RS/PVC	RIGID STEEL, PVC COATED
RT	RIGHT, REMOTE TELEMETRY
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
RVR	REDUCED VOLTAGE REVERSING
RV	ROOF VENT
RVNR	REDUCED VOLTAGE NON-REVERSING
RW	RAW WASTEWATER
R/W	RIGHT-OF-WAY

S

S	SINGLE, SOUTH, SIREN, SOIL OR WASTE, SUCTION, SOURCE
SA	SUPPLY AIR, SOFTWARE ALARM, SURGE ARRESTER
SAN	SANITARY
SB	SODIUM BISULFITE
SC	SOLID CORE, SPEED CONTROL
SCD	SCREWED, STREAMING CURRENT DETECTOR
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE (SPEC FOR MATL)
SCHED	SCHEDULE (TABLE, TIME)
SCRN	SCREEN
SCV	SWING CHECK VALVE
SD	SMOKE DETECTOR, STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SE	SOUTHEAST
SEC	SECOND, SECONDARY
SECT	SECTION
SEL	SELECTOR
SEP	SEPARATOR
SEW	SEWER
SF	SUPPLY FAN
SGT	SLUICE GATE
SH	SHOWER, SPACE HEATER
SHT	SHEET
SHLD	SHIELD
SIM	SIMILAR
SK	SINK
S/N	SOLID NEUTRAL
SLGT	SLIDE GATE
SLP	SLOPE
SMS	SHEET METAL SCREWS
SO2	SULFUR DIOXIDE
SOG	SLAB ON GRADE
SOL	SOLENOID
SOLN	SOLUTION
SP	SPARE, SUCTION PRESSURE, SUMP PUMP
SPC	SPACE
SPCR	SPACER
SPD	SPEED
SPEC	SPECIFICATIONS
SPST	SINGLE POLE, SINGLE THROW
SPV	SPOOL VALVE
SQ	SQUARE
SS	SANITARY SEWER, SUBSTATION, START-STOP
SSMH	SANITARY SEWER MANHOLE
SST	STAINLESS STEEL
ST	START
STA	STATION
STD	STANDARD
STL	STEEL
STO	STORAGE
STP	STOP
ST PR	STATIC PRESSURE
STR	STRAINER
STRUCT	STRUCTURAL
SUBST	SUBSTITUTE
SUBSTA	SUBSTATION

S (CONTINUED)

SUCT	SUCTION
SURF	SURFACE
SUSP	SUSPENDED
SUW	SURFACE WASH
SV	SOLENOID VALVE, SIGNAL VOLTAGE
SW	SWITCH
SWGR	SWITCHGEAR
SYMM	SYMMETRICAL

T

T	THERMOSTAT, TREAD, THROW, TIME
TB	TERMINAL BLOCK,TERMINAL BOX, TOP BAR
T&B	TOP AND BOTTOM
TBG	TUBING
TC	TIME CLOCK, TIME CLOSE
T/C	THERMOCOUPLE
TCV	TEMPERATURE CONTROL VALVE
TD	TEMPERATURE DETECTOR RELAY, TIME DELAY
TDE	TEST DEVICE
TDH	TOTAL DYNAMIC HEAD
TDR	TIME DELAY RELAY
TEFC	TOTALLY ENCLOSED FAN COOLED (MOTORS)
TEL	TELEPHONE
TEMP	TEMPERATURE, TEMPORARY
TERM	TERMINAL
TEWAC	TOTALLY ENCLOSED WATER TO AIR COOLED (MOTORS)
T&G	TONGUE AND GROOVE
TH	TOTAL HEAD
THD	THREAD
THHN	HEAT RESISTANT THERMOPLASTIC ELECTRICAL WIRE
THK	THICK, THICKNESS
THRU	THROUGH
THWN	MOISTURE & HEAT RESISTANT THERMOPLASTIC ELECTRICAL WIRE
TIT	TEMPERATURE INDICATOR TRANSMITTER
TJB	TERMINAL JUNCTION BOX
TK	TANK
T/L	TRANSIT LINE
TMPD	TEMPERED
TOC	TOP OF CONCRETE, TOP OF CURB
TOP	TOP OF PAVEMENT
TOS	TOP OF STEEL
TOT	TOTAL
TOW	TOP OF WALL
TR	TOP REGISTER, TIMER RELAY
TRF	TRANSFER FAN
TRG	TRANSFER GRILLE
TRNSN	TRANSITION
TRTD	TREATED
TRTMT	TREATMENT
TS	STRUCTURAL STEEL TUBING, TIME SWITCH, TEST STATION
TSP	TWISTED SHIELDED PAIR, TOTAL STATIC PRESSURE
TST	TWISTED SHIELDED TRIAD
TSW	TEMPERATURE SWITCH
TTC	TELEPHONE TERMINAL CABINET
TW	TREATED WATER
TURB	TURBIDITY
TYP	TYPICAL

U

U	HEAT TRANSFER COEFFICIENT
UBC	UNIFORM BUILDING CODE
U-F	UNFORMED, FLOAT FINISH
UFC	UNIFORM FIRE CODE
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
UPR	UPPER
UPS	UNINTERRUPTIBLE POWER SUPPLY
UR	URINAL
USS	UNIT SUBSTATION
U-TB	UNFORMED, TROWELED, HAIR BRUSH FINISH
UVR	UNDER VOLTAGE RELAY

V

V	VENT, VOLTS, VOLTMETER, VERTICAL
VA	VIRTUAL OR CALCULATED ANALOG, VOLT AMPERE
VAC	VACUUM, VOLTS ALTERNATING CURRENT
VAR	VARIES, VARIABLE
VC	VERTICAL CURVE
VDC	VOLT, DIRECT CURRENT
VEL	VELOCITY
VER	VERIFY
VERT	VERTICAL
VF	VENT FAN
VFD	VARIABLE FREQUENCY DRIVE
VI	VIBRATION ISOLATOR
VIF	VERIFY IN FIELD
VLV	VALVE
VP	VAPOR PROOF
VPC	POINT OF VERTICAL CURVATURE
VPT	POINT OF VERTICAL TANGENCY
VS	VOLTMETER SWITCH
VTP	VERTICAL TURBINE PUMP
VTR	VENT THRU ROOF

W

W	WASTE, WATT, WEST, WHITE, WIDTH, WIRE, STRUCTURAL STEEL WIDE FLANGE
W/	WITH
WAW	WASH WATER
WB	WET BULB
WC	WATER CLOSET
WCO	WALL CLEANOUT
WDG	WINDING
WDO	WINDOW
WESP	WASTEWATER ENGINEERING STANDARD PRACTICE
WF	WATER FOUNTAIN
WH	WATER HEATER
WHD	WATT HOUR DEMAND
WHSE	WAREHOUSE
WHT	WHITE
WL	WATERLINE
WM	WATER METER, WATT METER
WOG	WATER, OIL, GAS
W/O	WITHOUT
WP	WEATHERPROOF, WORK POINT
WPJ	WEAKENED PLANE JOINT
WS	WATERSTOP, WATER SURFACE
WSHR	WASHER
WSP	WELDED STEEL PIPE
WT	WEIGHT
WTR	WATER
WTRPRF	WATERPROOF
WV	WATER VALVE
WW	WASTE WATER
WWF	WELDED WIRE FABRIC

X

XBAR	CROSSBAR
XCVR	TRANSCEIVER
XDCR	TRANSDUCER
XFMR	TRANSFORMER
XHVY	EXTRA HEAVY
XMSN	TRANSMISSION
XMTR	TRANSMITTER
XP	EXPLOSION PROOF
XRF	TRANSFORMER
XSECT	CROSS SECTION
XS	EXTRA STRONG
XXS	DOUBLE EXTRA STRONG

Y

Y	YELLOW
YD	YARD
YEL	YELLOW

SYMBOLS

∠	ANGLE (STRUCTURAL STEEL)
@	AT
℄	CENTERLINE
°	DEGREES
°C	DEGREES CENTIGRADE
°F	DEGREES FAHRENHEIT
ø	DIAMETER, PHASE
Δ	DELTA, DIFFERENCE
≥	GREATER THAN OR EQUAL TO
≤	LESS THAN OR EQUAL TO
#	NUMBER, POUND
/	OF
Ω	OHM
ℙ	PLATE (STRUCTURAL STEEL)
±	PLUS OR MINUS

NOTES

1. SEE DRAWING SD288-G-003 FOR ABBREVIATIONS A THRU M.
2. ABBREVIATIONS OR SYMBOLS SHOWN ON DISCIPLINE SPECIFIC WASTEWATER STANDARD DRAWINGS SHALL TAKE PRECEDENCE OVER ABBREVIATIONS OR SYMBOLS SHOWN ON THIS DRAWING.

REGISTERED PROFESSIONAL ENGINEER
GWAIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
1	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP.: PYL SD288			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

GENERAL
ABBREVIATIONS FOR WASTEWATER FACILITIES
N THRU Z

SHEET NO. 4

SCALE NONE
DATE JANUARY 2007
SD288-G-004
DRAWING NUMBER
1
REV.

USER: dmontoy
DATE: 06JUN2009 14:02
FILE: J:\SD\sd288\sd288g004.R01
PLOT SCALE: 0.166667'/1
REF 1: J:\SD\sd288\ref\sd288udr.mst
REF 2:
REF 3:

HVAC SYMBOLS AND LEGEND

- 40x12 — SHEET METAL DUCT (1ST FIGURE, INSIDE WIDTH; 2ND FIGURE, INSIDE DEPTH)
- 20x12 — SHEET METAL DUCT WITH INTERNAL INSULATION (DIMENSION SHOWN IS NET INSIDE)
- ARROW INDICATES DIRECTION OF AIR FLOW IN DUCT
- (16x12) — HIDDEN SHEET METAL DUCT (1ST FIGURE, INSIDE WIDTH; 2ND FIGURE, INSIDE DEPTH)
- SUPPLY DUCT SECTION UP
- RETURN DUCT SECTION DOWN
- EXHAUST DUCT SECTION UP
- SUPPLY DUCT SECTION DOWN
- RETURN DUCT SECTION UP
- EXHAUST DUCT SECTION DOWN
- ROUND ELBOW UP
- ROUND ELBOW DOWN
- TV — TURNING VANES
- TURNING VANES (SMOOTH RADIUS)
- TAKE-OFF WITH ADJUSTABLE TURNING VANES
- AD — ACCESS DOOR
- AP — ACCESS PANEL
- VD — VOLUME DAMPER WITH LOCKING QUADRANT
- M — MOTORIZED DAMPER
- DUCT TRANSFORMATION, MAXIMUM 15° INCLUDED ANGLE EXCEPT WHERE SHOWN OTHERWISE
- FDC — FLEXIBLE DUCT CONNECTION
- 400 / 12x12x1 (XX) — CEILING SUPPLY DIFFUSER
- 200 / 10x10 (XX) — CEILING RETURN REGISTER
- 200 / 10x10 (XX) — EXHAUST REGISTER
- 200 / 10x10 (XX) — SIDEWALL RETURN OR EXHAUST REGISTER
- 200 / 10x10 (XX) — SIDEWALL SUPPLY REGISTER

  TOP FIGURE INDICATES CFM
  ARROW INDICATES FLOW DIRECTION
  BOTTOM FIGURE INDICATES NECK, DIFFUSER, REGISTER, OR GRILLE SIZE
  TEXT IN CIRCLE INDICATES REGISTER DESIGNATION

- 9x9 / 9"ø — RECTANGULAR TO ROUND DUCT TRANSFORMATION
- FLEXIBLE DUCT (6'-0" MAXIMUM LENGTH)
- FDR — FIRE DAMPER
- DL (CFM | WxH) — DOOR LOUVER
- T W25-EF-302-00 — ROOM THERMOSTAT & EQUIPMENT NUMBER (SEE EQUIPMENT SCHEDULES)
- CENTRIFUGAL FAN
- INLINE AXIAL FAN, BELT DRIVEN
- WALL MOUNTED AXIAL FAN AND BOOT
- VANE AXIAL FAN
- PROPELLER FAN
- OFM — ORIFICE FLOW METER
- VFM — VENTURI FLOW METER
- FILTER
- PARALLEL BLADE DAMPER
- OPPOSED BLADE DAMPER
- SP — STATIC PRESSURE SENSOR
- SD — SMOKE DETECTOR
- POWER OR GRAVITY ROOF VENTILATOR (EXHAUST)

HVAC ABBREVIATIONS

AL	ACOUSTIC LINED
DB	DRY BULB
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SEN MBH	SENSIBLE 1000 BTU PER HOUR
TSP	TOTAL STATIC PRESSURE

HVAC NOTES

1. ABBREVIATIONS SHOWN HERE SUPERCEDE THOSE FOUND ON DRAWINGS SD288-G-002 AND SD288-G-003.
2. DUCTING DESIGNATIONS SHOWN ON THE DRAWINGS ARE SIMILAR TO DEFINED PIPING SYSTEM ON DRAWING SD288-M-001.

REGISTERED PROFESSIONAL ENGINEER — GARIN DEAN WARREN — No. C65259 Exp. 09/30/07 — CIVIL — STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
0	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD2W88			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

MECHANICAL

HVAC SYMBOLS, LEGEND, ABBREVIATIONS AND GENERAL NOTES

SHEET NO. 42

SCALE NONE | DATE JANUARY 2007 | SD288-M-002 DRAWING NUMBER | 1 REV.

REF 7: REF 8: REF 9:
REF 4: REF 5: REF 6:
REF 1: REF 2: REF 3:
USER: dmanny
DATE: 24JUN2009 14:02
FILE: J:\SD\sd288\sd288sm002.R01
PLOT SCALE: 0.166667:1
J:\SD\sd288\ref\sd288dr.mst

EQUIPMENT SCHEDULE

EQUIP TAG NO. AREA	EQUIP TAG NO. TYPE	EQUIP TAG NO. NO.	QNTY	ITEM	LOCATION	TYPE	CAPACITY EACH, GPM	HEAD, PSI	MOTOR EACH, HP	DRIVE TYPE	POWER, V/PH/HZ	SPEC SEC	MFRS / MODEL	NOTES	P&ID EQUIP. TAG NO. TYPE	P&ID EQUIP. TAG NO. NO.
W25-	SGR	OC5 01	1	SLUDGE FEED PUMP #5 GRINDER	BASEMENT DEWATERING BLDG	IN-LINE	350	- -	5	CONST	480/3/60	11393	FRANKLIN MILLER SUPER SHREDDER	MATCH EXISTING	SGR-	50501
W25-	PMP-	OC5 14	1	SLUDGE FEED PUMP #5	BASEMENT DEWATERING BLDG	PROGRESSIVE CAVITY TYPE	350	25	20	VFD	480/3/60	11315	MOYNO	SIMILAR TO EXISTING , EXCEPT MOUNT MOTOR PIGGYBACK OVER PUMP	PMP-	50601
W25-	CEN-	OC5 01	1	CENTRIFUGE #5	2ND FLOOR, DEWATERING BLDG	HIGH SPEED; INLET SOLIDS 2-3%; CAKE SOLIDS 25-27%, MIN. SOLIDS REMOVAL. 95%	300/3900 LBS/HR	- -	MAIN: 250 BACK: 50 LUBE OIL: 1/3 TOTAL: 300	VFD VFD	480/3/60	11356	ANDRITZ, FLOTTWEG, AND ALFA LAVAL		CTF-	50000
W25-	PMP-	OC5 13	1	DEWATERED SLUDGE (CAKE) PUMP #5	1ST FLOOR, DEWATERING BLDG	PISTON PUMP	30 to 60	350 to 950	100	HYDR	480/3/60	11163	SCHWING BIOSET	MATCH EXISTING DRIVES	PMP-	50701
W25-	PMP-	OC5 16	1	SLIP INJECTION SYSTEM #5	1ST FLOOR, DEWATERING BLDG	DIAPHRAGM METERING TYPE	60 gph		3	ADJ	480/3/60	11163	MILTON ROY	SIMILAR TO EXISTING	XXX	XXX
HOISTS AND CRANES																
W25-	CRN-	00 202	1	MONORAIL & HOIST	BASEMENT DEWATERING BLDG	1 TON, MANUAL	1 TON	- -	- -					LOCATE OVER SLUDGE FEED PUMP #5		
POLYMER SYSTEM																
W25-	CFR	56411	1	DEWATERING POLYMER BLEND UNIT # 4	BASEMENT DEWATERING BLDG	45 LB ACTIVE/DRY TON SOLIDS @ 0.4 TO 1% SOLN	RANG: 15-100, TYP: 43-60	40-70	5		480/3/60	11770	STRANCO / POLYBLEND	WITH C CONTROLS	CFR	56411
W25-	PMP-	50801	1	C-5 POLYMER SOLUTION FEED PUMP #1	BASEMENT DEWATERING BLDG	PROGRESSIVE CAVITY TYPE	15-91	65	7.5	VFD	480/3/60	11315	MOYNO		PMP-	50801
W25-	PMP-	50901	1	C-5 POLYMER SOLUTION FEED PUMP #2											PMP-	50901
CONTROL VALVES																
W25-	VSL-	58115	1	CONTROL VALVES - DEWATERED SLUDGE	WEST HOPPERS, BIN 1	BALL VALVES, ANSI 600 LB, W/ PNEUM ACTUATOR, OPEN/CLOSE SERVICE	8" DIAMETER	1000	- -	PNEUM	- -	15115	KF INDUSTRIES, PBV	OPEN/CLOSE SERVICE, 1000 PSI MAX OP PRESSURE, ANSI 600 LB FLANGES.	VSL-	58115
W25-	VSL-	58215	1		WEST HOPPERS, BIN 2										VSL-	58215
W25-	VSL-	58315	1		WEST HOPPERS, BIN 3										VSL-	58315
W25-	VSL-	58415	1		WEST HOPPERS, BYPASS/WASHDOWN										VSL-	58415

HVAC SCHEDULE

EQUIPMENT NUMBER	LOCATION	AREA SERVED	DESIGN CRITERIA FLOWRATE (CFM)	PRESSURE IN H20	COOLING CAP BtuH	HEATING CAP BtuH	SEER	ELECTRICAL VOLTS	PHASE	HZ
W25-HVS-ACU-001	ROOF DEWATERING BLDG	MCC ROOM, FIRST FLOOR	1700	1.6	57,500	-	13	208	3	60
W25-HVS-HP-001	ROOF DEWATERING BLDG	NEW OFFICE/CONTROL ROOM	-	-	12,000	12,000	13	208	1	60
W25-HVS-FACU-001	NEW OFFICE/CONTROL ROOM	NEW OFFICE/CONTROL ROOM	300	-	-	-	-	208	1	60

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
0	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

MECHANICAL
EQUIPMENT SCHEDULE

SHEET NO. 43

SCALE NONE
DATE JANUARY 2007
SD288-M-301 DRAWING NUMBER
1 REV.

REF 4: REF 5: REF 6:
REF 1: J:\SD\sd288\ref\sd288dr-mst REF 2: REF 3:
USER: dmannon PLOT SCALE: 0.166667:1
DATE: 29JUN2009 14:02
FILE: J:\SD\sd288\sd288m30LR01

PIPING SCHEDULE

LEGEND	SERVICE	PRESSURE (PSI) WORKING	PRESSURE (PSI) TEST (NOTE 2)	SIZE (IN) (NOTE 1.)	INSTALLATION	PIPING MATERIAL	SPEC SECTION	COATING	LINING	REMARKS
DSL	DIGESTED SLUDGE	45-125	150	2 1/2 THRU 8	EXPOSED	STL / DI	15230/15251	09900	GLASS	
				10 THRU 24		DI	15251	09900	GLASS	
DWS	DEWATERED SLUDGE (HIGH PRESS)	500-950	1,200	8	EXPOSED	STL	15230	09900	GLASS	
CEN	CENTRATE	12-30	50	8 TO 24	EXPOSED	STL, SCH 40	15230	09900	GLASS	
POL	POLYMER, POLYMER SOLUTION	100-125	150	ALL	EXPOSED	PVC, SCH 80	15230	09900	- -	USE CPVC FOR SUNLIGHT EXPOSED
DR	DRAINAGE	GRAVITY	10 FT ABOVE HI POINT	3 AND SMALLER	EXPOSED	PVC	15150	09900	- -	
				4 AND LARGER	EXPOSED	CI SOIL PIPE	15150	09900	MFR'S STD	
PD	PUMPED DRAINAGE	60-125	150	3 AND SMALLER	EXPOSED	PVC, SCH 80	15230	09900	- -	USE CPVC FOR SUNLIGHT EXPOSED
		25-50	80	4 AND LARGER	EXPOSED	DI	15251	09900	CEMENT	FLANGED CONNECTIONS, UON
VENT	DRAINAGE VENT	GRAVITY	10 FT ABOVE HI POINT	ALL	EXPOSED	CI SOIL PIPE	15150	09900	- -	
1W	NUMBER 1 WATER (POTABLE)	80-100	125	4 AND SMALLER	EXPOSED	COPPER, TYPE L	15230	09900	- -	
				6 AND LARGER		DI	15251	09900	- -	
2W	NUMBER 2 WATER (SECONDARY EFFLUENT, CHLORINATED, FILTERED)	80-100	125	4 AND SMALLER	EXPOSED	COPPER, TYPE L	15230	09900	- -	
				6 AND LARGER		DI	15251	09900	- -	
3W	NUMBER 3 WATER (SECONDARY EFFLUENT, CHLORINATED, NOT FILTERED)	80-100	125	4 AND SMALLER	EXPOSED	COPPER, TYPE L	15230	09900	- -	
				6 AND LARGER		DI	15251	09900	- -	
SA	SERVICE AIR	60-120	150	2 AND SMALLER	EXPOSED	COPPER, TYPE L	15230	09900	- -	
				2 1/2 THRU 6		STL, SCH 40, BLK	15230	09900	EPOXY	
HOS	HYDRAULIC OIL SUPPLY	SEE SPEC	SEE SPEC	ALL	EXPOSED	HYDRAULIC TUBING & HOSE	11173	09900	- -	DESIGN & TESTING FOR HYDRAULIC TUBING & HOSES PER SPEC
HOR	HYDRAULIC OIL RETURN									
REF	REFRIGERANT	200	500	1 AND SMALLER	EXPOSED	SEAMLESS COPPER TUBE	15230	- -	- -	INSULATED PER 15080

NOTES
1. PIPE SIZES ARE SHOWN ON THE DRAWINGS.
2. ALL PIPING SHALL BE PRESSURE TESTED WITH WATER IN ACCORDANCE WITH SPECIFICATION SECTION 15230, UNLESS OTHERWISE NOTED.

REF 7:
REF 8:
REF 9:

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REF 5:
REF 6:

REF 1: J:\SD\sd288\ref\sd288bdr.mst
REF 2:
REF 3:

USER: dmanmgp
DATE: 29JUN2009 14:02
FILE: J:\SD\sd288\sd288m302.R01

PLOT SCALE: 0.166667:1

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
0	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	G. WARREN
	DRAWN BY:	O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT

MECHANICAL
PIPING SCHEDULE

SHEET NO. 44

SCALE NONE
DATE JANUARY 2007
SD288-M-302
DRAWING NUMBER
1
REV.

SUPPLY DUCT FROM ROOF

RETURN DUCT TO ROOF

RELOCATE EXIST LIGHT FIXTURE AS necessary

14"ø FRP

RR-1

1200
24"x24"

ELECTRICAL PANEL

W25-HVS-ACU-001 T

400
6"x12" SR-1

ELECTRICAL ROOM

14"ø FRP DUCT

EL 116.00 VIF BEFORE INSTALLATION. ELECTRICAL CONDUIT AND CABLE TRAYS NOT SHOWN FOR CLARITY

10"ø FRP DUCT

RR-1 1550
18"x18"

STAIRWAY

VESTIBULE

ELECTRICAL PANEL

STAIRWAY

PUMP ROOM

10" CENT

LOADING & UNLOADING AREA

HATCHWAY

MECHANICAL EQUIPMENT ROOM

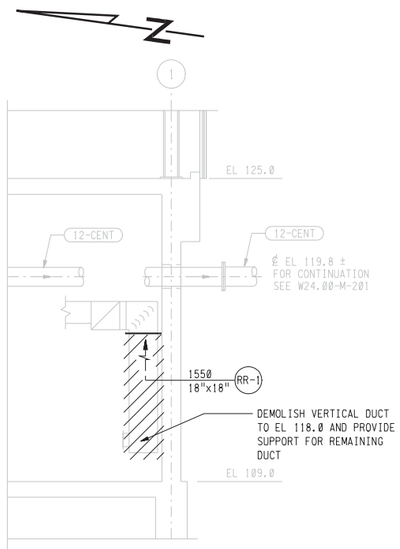
SLUDGE HOLDING TANK

HYDRAULIC POWER UNIT (TYP OF 4)

1 2 3 4 5 M E.1 4.A

FIRST FLOOR PLAN

1/4"=1'-0"

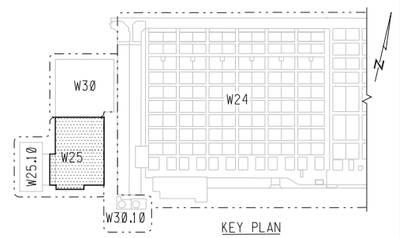


SECTION A

1/4"=1'-0"

NOTES

1. PROVIDE DUCT SUPPORTS PER SPECIFICATION SECTION 15060.
2. SEE DWG E-103.2 FOR THERMOSTAT CONDUIT ROUTE.



KEY PLAN

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
4	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			
3	11JAN2007	REVISED PER SD288			
2		REVISED PER SD266			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
SLUDGE DEWATERING BUILDING
MECHANICAL

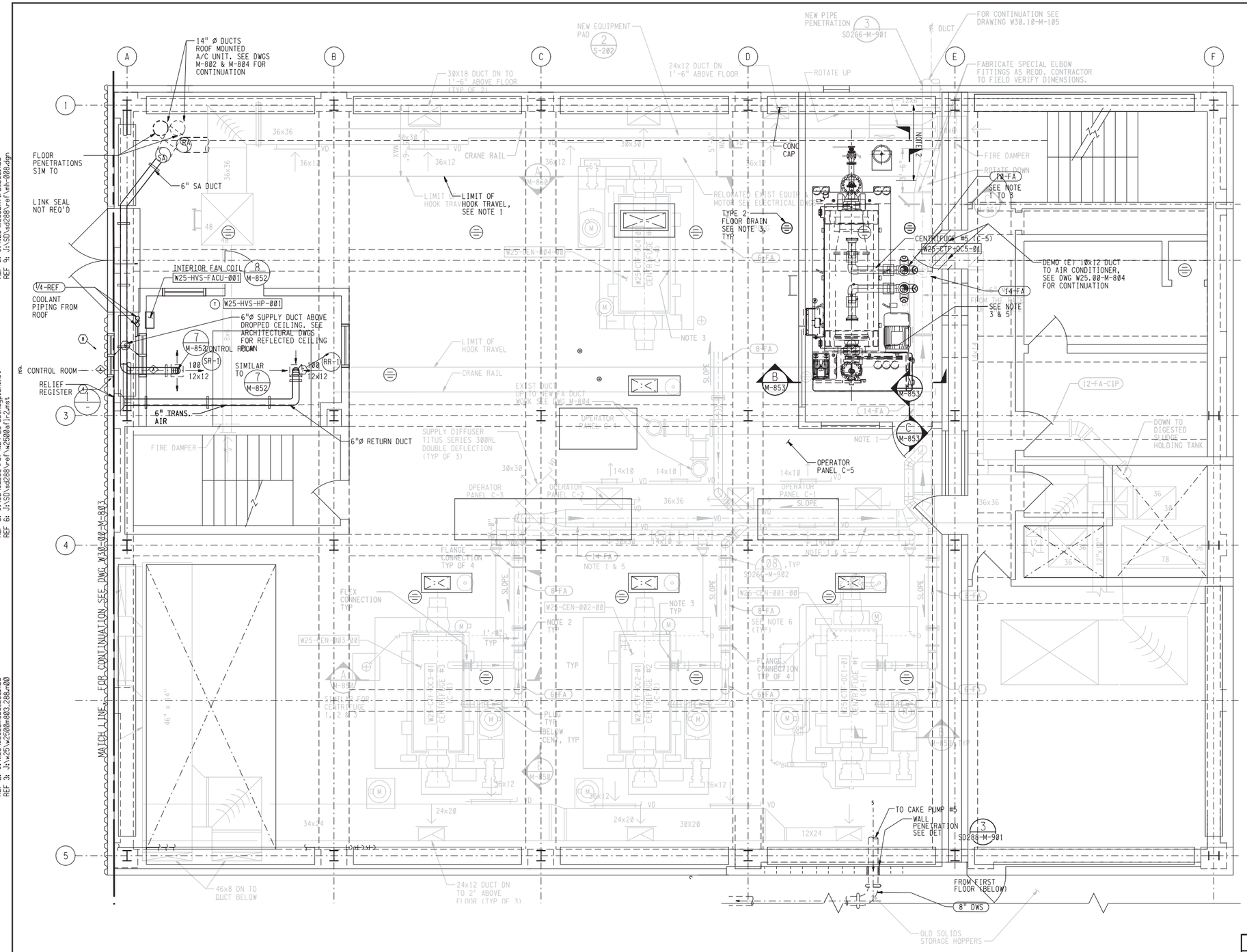
HVAC FIRST FLOOR PLAN

SHEET NO. 73

SCALE AS SHOWN
DATE JANUARY 2007

W25.00-M-802
DRAWING NUMBER

3
REV.



TOTAL SUPPLY AND EXHAUST AIR FLOW INTO THE NEW CONTROL ROOM SHALL BE 400 CFM BALANCED WITH A 50 CFM DIFFERENTIAL AND POSITIVE PRESSURE. THE 6 INCH RETURN DUCT SHALL BE EXTENDED TO THE THICKENING ROOM AND THE RELIEF REGISTER WITH DAMPER INSTALLED IN THE THICKENING ROOM.

SECOND FLOOR PLAN

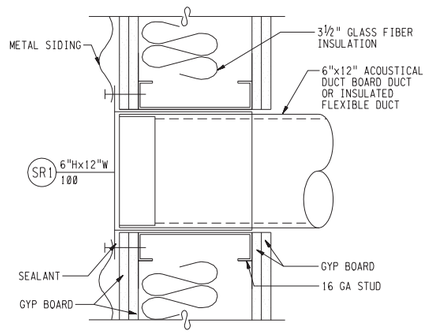
1/4"=1'-0"

3" ON ORIGINAL DOCUMENT

0 1 2 3

NOTES

1. PROVIDE SST WIRE HOSE HANGER AT CENTRIFUGE.
2. POINT OF CONNECTION AT FLANGE ON DUCT.
3. PROVIDE BALANCING DAMPERS FOR FA DUCT FROM CENTRIFUGE.
4. SEE DWG W25.00-E-103.2 FOR THERMOSTAT CONDUIT ROUTE.
5. PROVIDE 6" FOUL AIR DUCT AND CONNECT TO EXISTING 14" FOUL AIR DUCT IF CENTRATE DISCHARGE CHUTE VENT IS REQUIRED BY CENTRIFUGE MANUFACTURER.

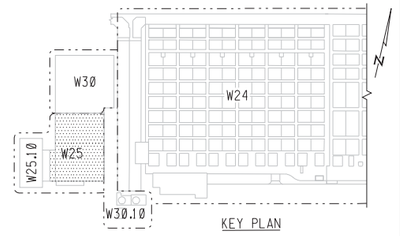


NOTES:

1. COORDINATE INSTALLATION WITH ARCH DWGS

RELIEF REGISTER

DETAIL 1 / NTS



KEY PLAN

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	REC.	APP.
4	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			
3	13JUN2007	CONFORMED DRAWING	GPW	GPW	TNC
2	11JAN2007	REVISED PER SD288			
		PREVIOUS REVISIONS NOT IN CONTRACT			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	K. ENG / O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
SLUDGE DEWATERING BUILDING
MECHANICAL

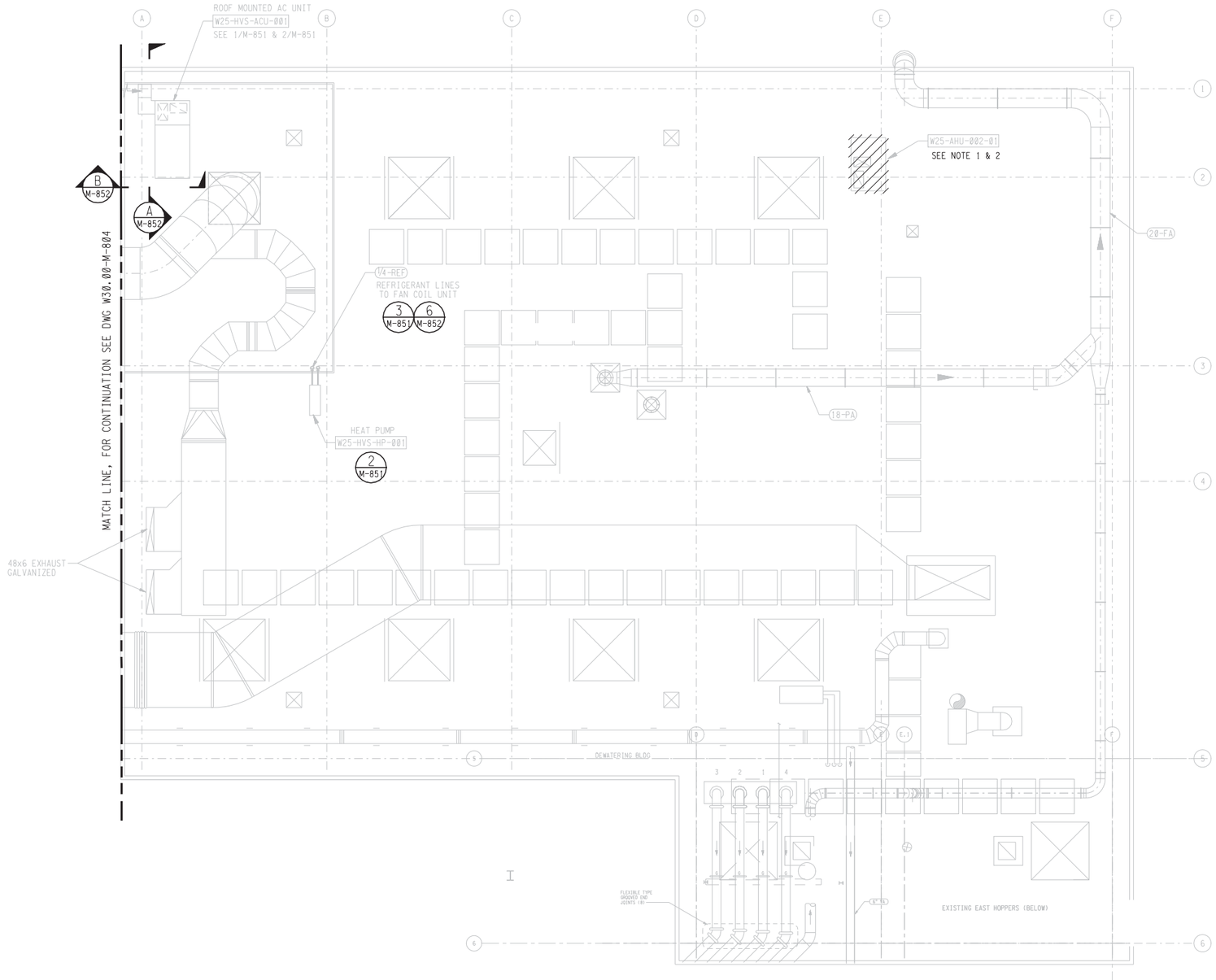
HVAC SECOND FLOOR PLAN

SHEET NO. 74

SCALE AS SHOWN
DATE JANUARY 2007

W25.00-M-803 — DRAWING NUMBER

4 — REV.



ROOF PLAN

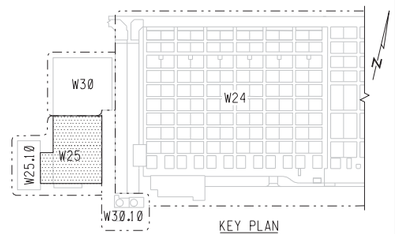
3/16 "=1'-0"

3" ON ORIGINAL DOCUMENT

0 1 2 3

NOTES

1. SEE SPECIFICATION FOR CONSTRUCTION SEQUENCING.
2. DEMO EXISTING AHU AFTER NEW CONTROL ROOM IS IN SERVICE. PROVIDE 16GA GALVANIZED RAISED COVER OVER EXISTING OPENINGS. SEAL SMALL OPENINGS W/ FLASHING CEMENT.



KEY PLAN

REGISTERED PROFESSIONAL ENGINEER
GRAIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

NO.	DATE	REVISION	BY	REC.	APP.
A	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			
A	11JAN2007	REVISED PER SD288			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	O. DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
SLUDGE DEWATERING BUILDING
MECHANICAL

HVAC ROOF PLAN

SHEET NO. 75

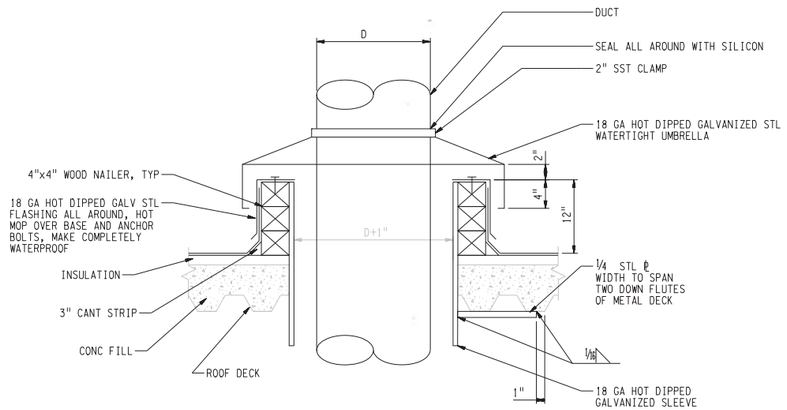
SCALE AS SHOWN
DATE JANUARY 2007

W25.00-M-804
DRAWING NUMBER

3
REV.

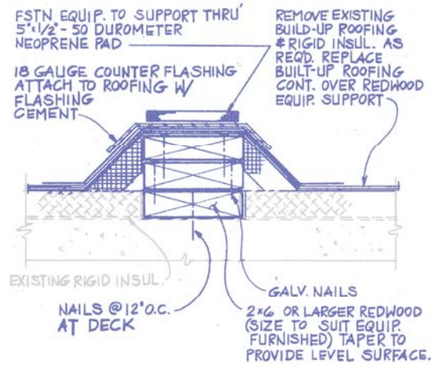
NOTES:

1. REMOVE & REPLACE EXIST BUILT-UP ROOFING & RIGID INSUL AS REQD.



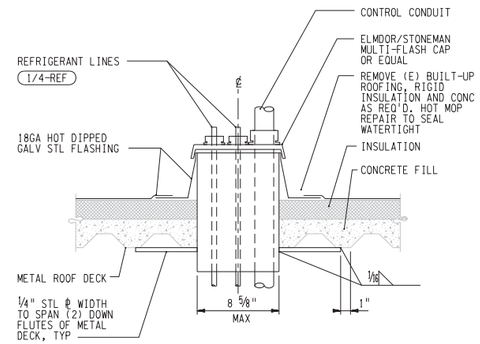
DUCT PENETRATION

DETAIL 1 — W30.00-M-804



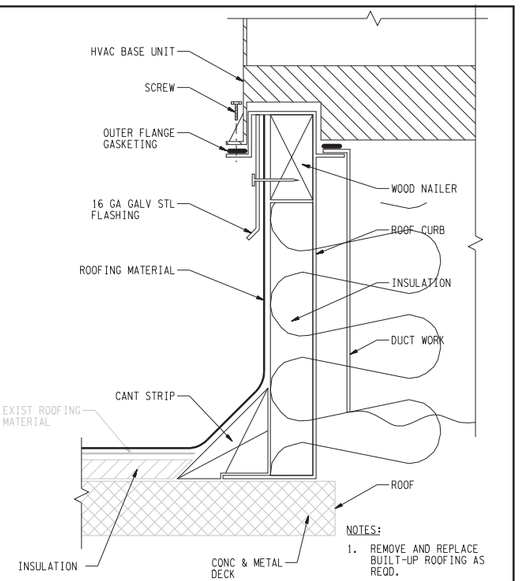
ROOF EQUIPMENT SUPPORT

DETAIL 2 — NTS — M-852



REFRIGERANT PENETRATION

DETAIL 3 — NTS — M-804

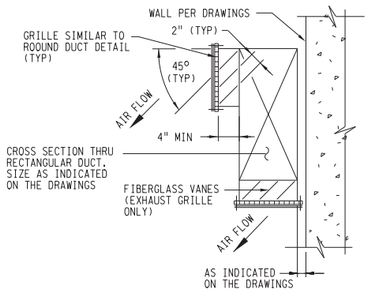


NOTES:

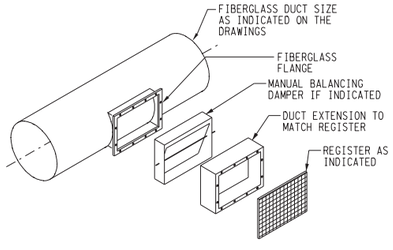
1. REMOVE AND REPLACE BUILT-UP ROOFING AS REQD.
2. UTILIZE MANUFACTURER'S PREFABRICATED EQUIPMENT BASE AND CURB.

AIR CONDITIONER BASE

DETAIL 4 — NTS — VAR



RECTANGULAR DUCT



ROUND DUCT

NOTES:

1. SUPPLY GRILLE SIZES ARE FROM INSIDE TO INSIDE OF GRILLE STOP, AS INDICATED ON THE DRAWINGS.
2. GRILLE LATTICE WORK TO OCCUPY NO MORE THAN 9% OF TOTAL GRILLE AREA.
3. ALL FIBERGLASS PIECES ARE TO MATCH COLOR OF FIBERGLASS DUCT.

AIR SUPPLY OR EXHAUST GRILLE

DETAIL 5 — NTS — M-802

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
0	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			

REGISTERED PROFESSIONAL ENGINEER — GARIN DEAN WARREN — No. C65259 Exp. 09/30/07 — CIVIL — STATE OF CALIFORNIA

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	D. KREIDEN-KARAIM
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
SLUDGE DEWATERING BUILDING
MECHANICAL
HVAC SECTIONS AND DETAILS 1

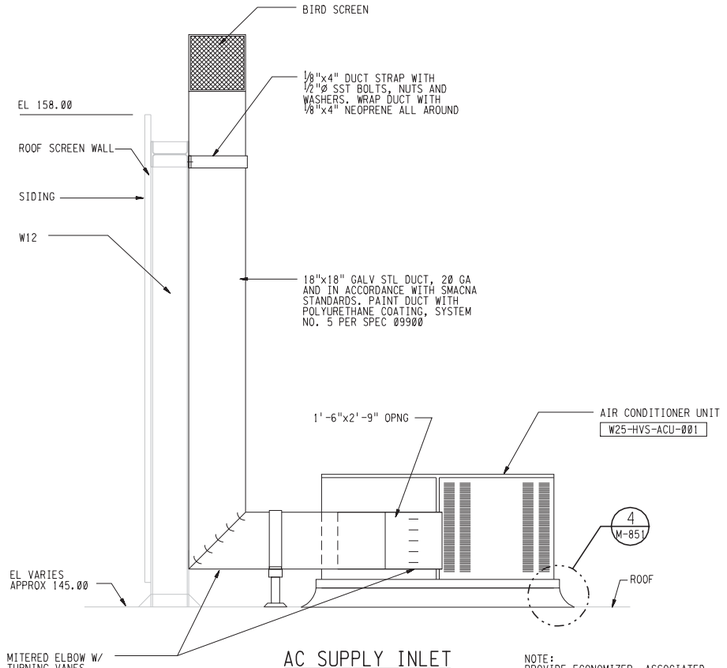
SHEET NO. 76

SCALE AS SHOWN
DATE JANUARY 2007
W25.00-M-851 — DRAWING NUMBER
1 — REV.

REF 4: J:\w25\w255ecsd_316.e00
REF 5: J:\SD\xd288\ref\C-5 Foul Air Ductwork Redesign2 (2).dgn
REF 6: J:\SD\xd288\ref\C-5 Foul Air Ductwork Redesign2 (2).dgn
REF 7:
REF 8:
REF 9:

REF 1: J:\SD\xd288\ref\xd288bdr.mst
REF 2:
REF 3:

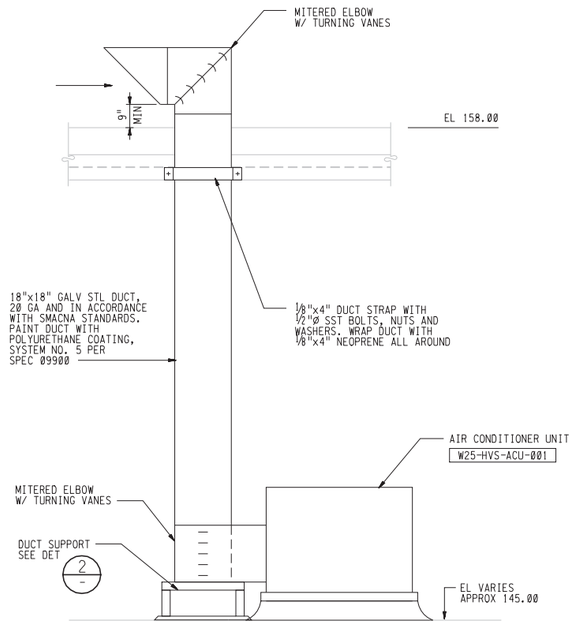
USER: dmannon
DATE: 29JUN2009 14:13
FILE: J:\SD\xd288\w2500m851.R01
PLOT SCALE: 4:1



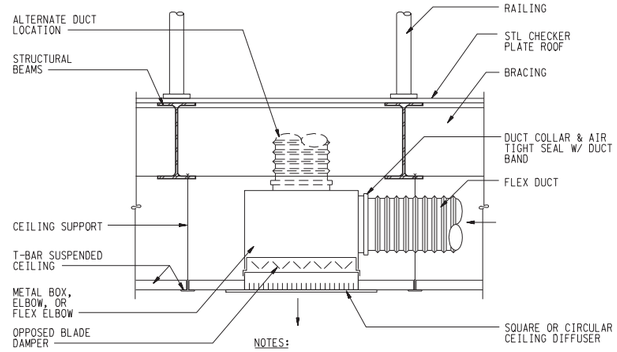
AC SUPPLY INLET

SECTION A NTS M-804

NOTE:
PROVIDE ECONOMIZER, ASSOCIATED DAMPERS, AND APPURTENANCES FOR THE MODIFIED INTAKE ARRANGEMENT.

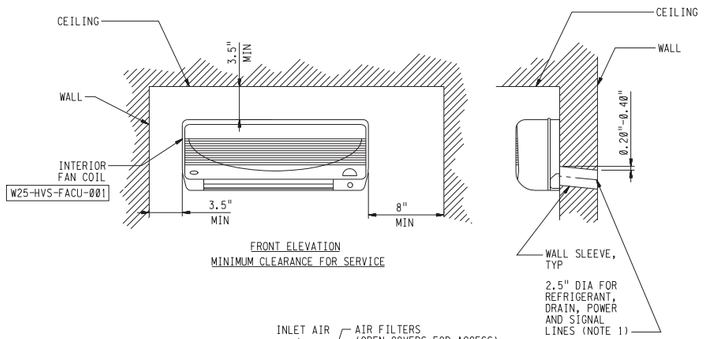


SECTION B NTS M-804



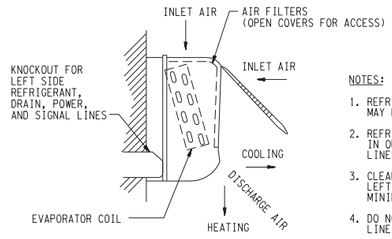
NOTES:
1. SIMILAR FOR RETURN REGISTER

DETAIL 7 NTS M-803



FRONT ELEVATION
MINIMUM CLEARANCE FOR SERVICE

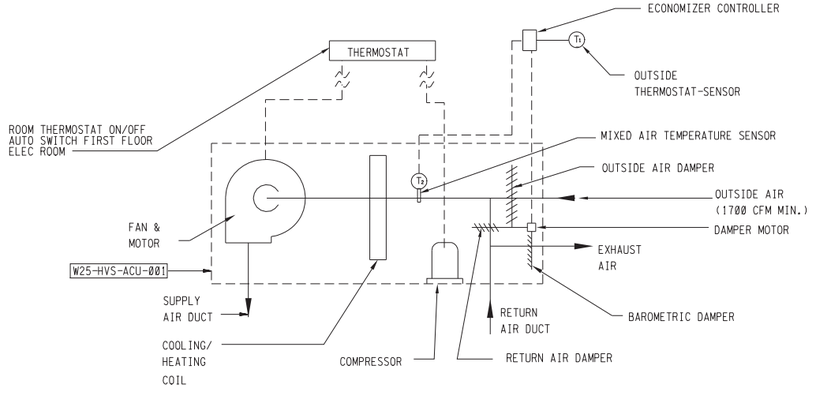
RIGHT SIDE VIEW



LEFT SIDE VIEW

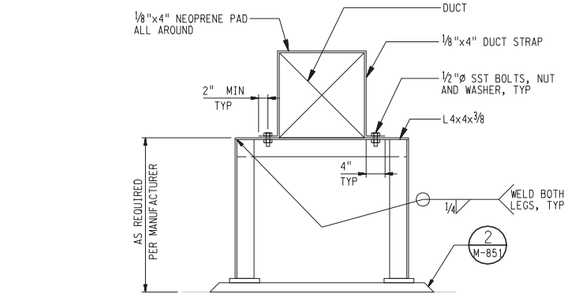
NOTES:
1. REFRIGERANT, DRAIN AND POWER CONNECTIONS MAY BE MADE REAR, LEFT SIDE OR RIGHT SIDE.
2. REFRIGERANT IS METERED BY CAPILLARY TUBES IN OUTDOOR UNIT. INSULATE BOTH REFRIGERANT LINES.
3. CLEARANCE OF 3½" ON TOP OF AND TO THE LEFT OF THE FAN COIL UNIT ARE ABSOLUTE MINIMUMS. CLEARANCE OF 10" ARE RECOMMENDED.
4. DO NOT INSERT A TRAP IN CONDENSATE DRAIN LINE. DRAIN IS INTERNALLY TRAPPED.
5. FILL VOID BETWEEN SLEEVES AND PIPE W/ POLYURETHANE FOAM.

DETAIL 8 NTS M-803



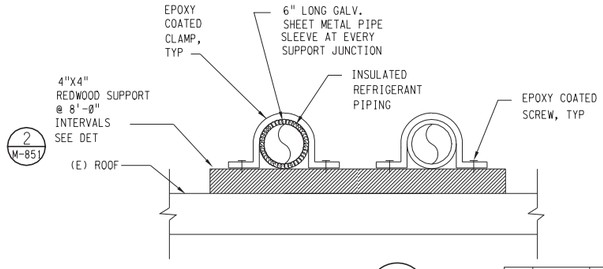
ROOFTOP AIR CONDITIONER, CONTROL DIAGRAM

DETAIL 1 NTS TYP



DUCT SUPPORT

DETAIL 2 NTS -



DETAIL 6 NTS TYP

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
1	06JUN2009	IN SERVICE 09DEC2009 RECORD DRAWING INSP. PYL SD288			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	C. URENDA
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

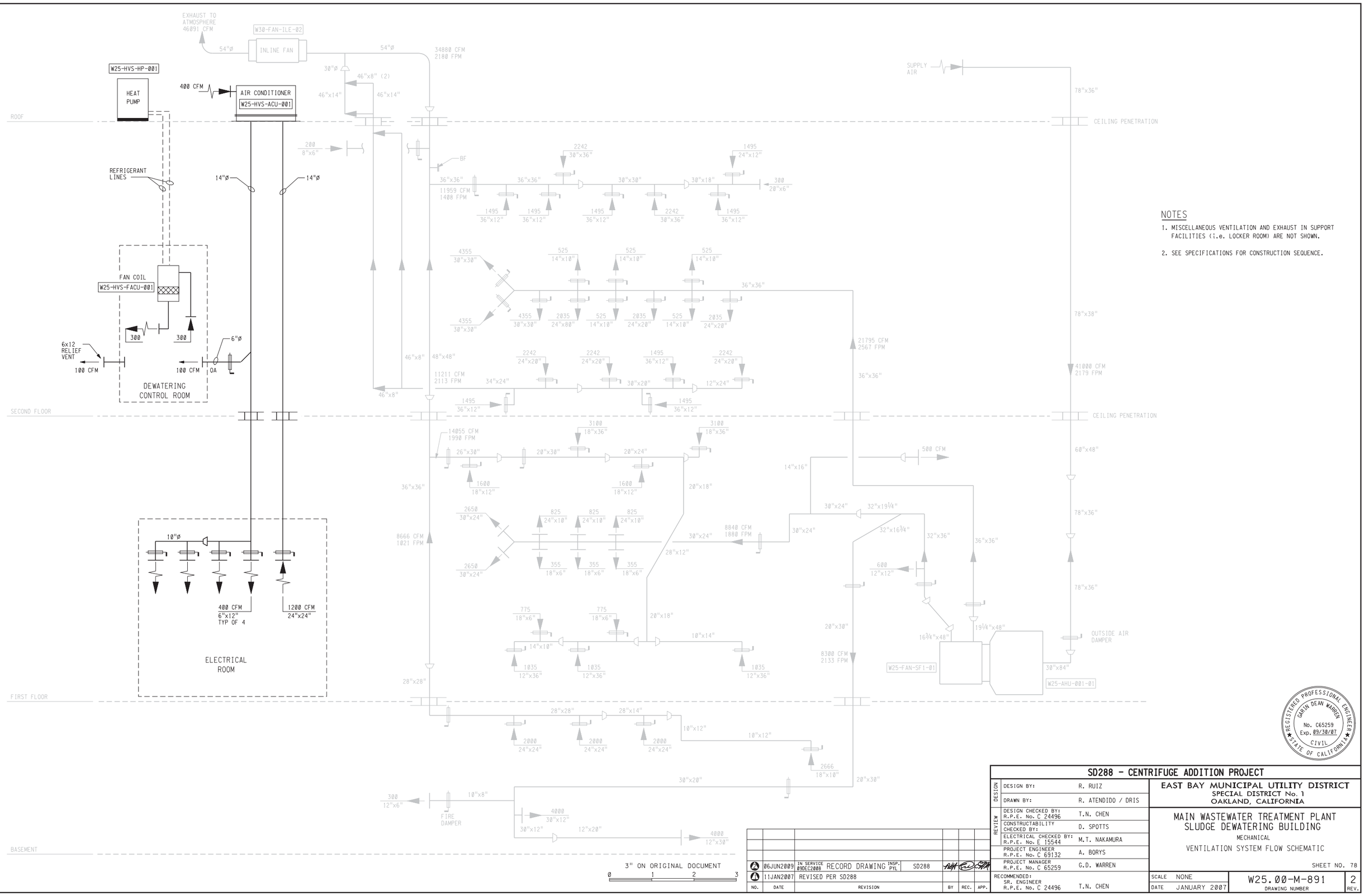
EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
SLUDGE DEWATERING BUILDING
MECHANICAL
HVAC SECTIONS AND DETAILS 2

SHEET NO. 77

SCALE	AS SHOWN	W25.00-M-852	1
DATE	JANUARY 2007	DRAWING NUMBER	REV.

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA



NOTES

1. MISCELLANEOUS VENTILATION AND EXHAUST IN SUPPORT FACILITIES (i.e. LOCKER ROOM) ARE NOT SHOWN.
2. SEE SPECIFICATIONS FOR CONSTRUCTION SEQUENCE.

REGISTERED PROFESSIONAL ENGINEER
GWAIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
2	06JUN2009	IN SERVICE 09DEC2008 RECORD DRAWING INSP. PYL SD288			
1	11JAN2007	REVISED PER SD288			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	R. ATENDIDO / DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
RECOMMENDED:	SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
SLUDGE DEWATERING BUILDING
MECHANICAL
VENTILATION SYSTEM FLOW SCHEMATIC

SHEET NO. 78

SCALE NONE
DATE JANUARY 2007
W25.00-M-891
DRAWING NUMBER
2
REV.

WAS THICKENING STATION
(W30)
SEE DWG W30.00-M-080

SLUDGE DEWATERING BUILDING (W25)

W25-CTF-0C4-01

W25-CTF-0C5-01

W25-CTF-0C3-01

W25-CTF-0C2-01

W25-CTF-0C1-01

BF

4-FA

4"x8" REDUCER

8-FA

14-FA

8"x16" REDUCER

500 CFM TYP 4 1432 FPM

6"x8" REDUCER

6-FA

DMPR TYP

POC REMOVE BF

NEW WALL PENETRATION

2339 CFM
2000 FPM

20"x24" REDUCER

20-FA

12"x18" REDUCER

18-FA

2500 CFM
1415 FPM

20"x10" REDUCER

12-FA CIP

10-FA

1000 CFM 1834 FPM

DIGESTED SLUDGE WELL

WEST SLUDGE HOPPER 3

WEST SLUDGE HOPPER 2

WEST SLUDGE HOPPER 1

5500 CFM
ATMOSPHERE

STACK
24-FA

W30-TKS-301-00
WEST SCRUBBER

18-FA

24" BF

24"x24"x18" TEE

DMPR & FLEX CONN

5500 CFM 1750 FPM

W30-FA -FAN-01

1½"-DR

EXIST PLUME ELIMINATOR

REGISTERED PROFESSIONAL ENGINEER
GARIN DEAN WARREN
No. C65259
Exp. 09/30/07
CIVIL
STATE OF CALIFORNIA

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.
2	06JUN2009	IN SERVICE 03DEC2008 RECORD DRAWING INSP. PYL SD288			
1	11JAN2007	REVISED PER SD288			

SD288 - CENTRIFUGE ADDITION PROJECT

DESIGN	DESIGN BY:	R. RUIZ
	DRAWN BY:	R. ATENDIDO / DRIS
REVIEW	DESIGN CHECKED BY: R.P.E. No. C 24496	T.N. CHEN
	CONSTRUCTABILITY CHECKED BY:	D. SPOTTS
	ELECTRICAL CHECKED BY: R.P.E. No. E 15544	M.T. NAKAMURA
	PROJECT ENGINEER R.P.E. No. C 69132	A. BORYS
	PROJECT MANAGER R.P.E. No. C 65259	G.D. WARREN
	RECOMMENDED: SR. ENGINEER R.P.E. No. C 24496	T.N. CHEN

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MAIN WASTEWATER TREATMENT PLANT
SLUDGE DEWATERING BUILDING
MECHANICAL
FOUL AIR SYSTEM FLOW SCHEMATIC

SHEET NO. 79

SCALE NONE
DATE JANUARY 2007

W25.00-M-892
DRAWING NUMBER

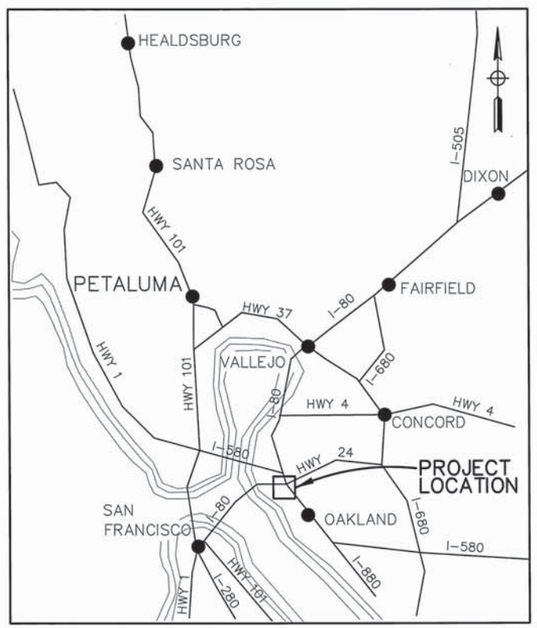
2
REV.

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

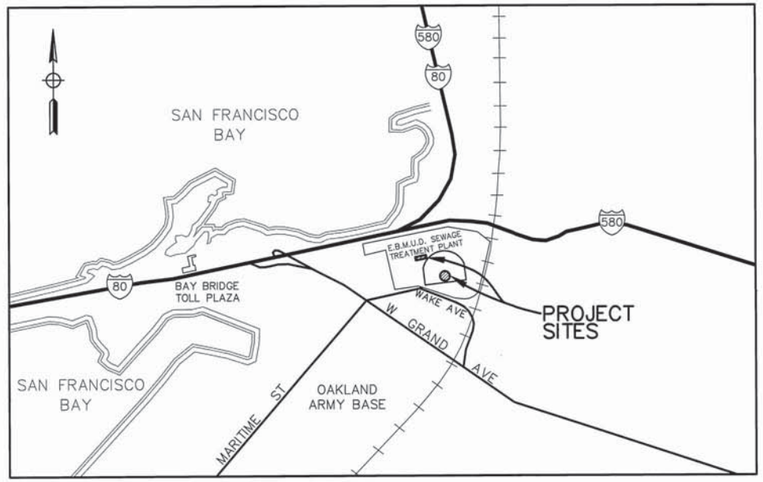
EAST BAY MUNICIPAL UTILITY DISTRICT

OPERATIONS CENTER HVAC UPGRADE

SD 220
MARCH 1996
VOLUME 2 - DRAWINGS



LOCATION MAP



VICINITY MAP

RECOMMENDED — Edward A. McCarnes
MGR OF WASTEWATER DESIGN AND CONSTRUCTION
R.P.E. NO. 33317

RECOMMENDED — David R. Williams
MGR OF SUPPORT SERVICES
R.P.E. NO. 25942

APPROVED — Michael J. Wallis
DIRECTOR OF WASTEWATER
R.P.E. NO. 30976

REGISTERED PROFESSIONAL ENGINEER — DANIEL BOYD REMPEL — No. M025091 Exp. 9-30-99 — MECHANICAL — STATE OF CALIFORNIA

SHEET INDEX

SHEET NO.	DWG	TITLE
1	G-1	COVER SHEET
2	M-1	EQUIPMENT SCHEDULES
3	M-2	LEGEND & NOTES
4	M-3	SITE PLAN
5	M-4	BASEMENT DEMOLITION PLAN
6	M-5	FIRST FLOOR DEMOLITION PLAN
7	M-6	MEZZANINE DEMOLITION PLAN
8	M-7	ROOF DEMOLITION PLAN
9	M-8	FIRST FLOOR PLAN & PARTIAL PLANS
10	M-9	MEZZANINE PLAN
11	M-10	ROOF PLAN
12	M-11	ENLARGED DEMOLITION PLANS
13	M-12	ENLARGED PLANS
14	M-13	SECTIONS & DETAILS
15	M-14	DETAILS
16	M-15	CONTROLS SCHEMATICS
17	M-16	TITLE 24
18	E-1	LEGEND
19	E-2	ONE-LINE DIAGRAMS (DEMOLITION)
20	E-3	BASEMENT PLAN (DEMOLITION)
21	E-4	FIRST FLOOR PLAN (DEMOLITION)
22	E-5	MEZZANINE PLAN (DEMOLITION)
23	E-6	ROOF PLAN (DEMOLITION)
24	E-7	ONE-LINE DIAGRAMS (IMPROVEMENTS)
25	E-8	FIRST FLOOR PLAN, SOUTH (IMPROVEMENTS)
26	E-9	FIRST FLOOR PLAN, NORTH (IMPROVEMENTS)
27	E-10	MEZZANINE PLAN (IMPROVEMENTS)
28	E-11	ROOF PLAN (IMPROVEMENTS)
29	E-12	CONTROL DIAGRAMS (DEMOLITION AND IMPROVEMENTS)
30	E-13	DETAILS AND ELEVATIONS (DEMOLITION AND IMPROVEMENTS)
31	S-0	GENERAL NOTES
32	S-1	FRAMING PLAN, DETAILS
33	S-2	MEZZANINE FRAMING PLAN, DETAILS
34	S-3	ROOF FRAMING PLAN, DETAILS
35	S-4	OPERATIONS CENTER SEISMIC UPGRADE - UPPER ROOF PLANS
36	S-5	OPERATIONS CENTER SEISMIC UPGRADE - MEZZANINE FLOOR PLANS
37	S-6	OPERATIONS CENTER SEISMIC UPGRADE - EXTERIOR ELEVATIONS
38	S-7	OPERATIONS CENTER SEISMIC UPGRADE - INTERIOR ELEVATIONS
39	S-8	OPERATIONS CENTER SEISMIC UPGRADE - SECTIONS
40	S-9	NOT USED
41	S-10	SEDIMENTATION BASIN BLOWER BUILDING - PLANS & ELEVATIONS
42	S-11	SEDIMENTATION BASIN BLOWER BUILDING - SECTIONS & DETAILS
43	A-1	SEDIMENTATION BASIN BLOWER BUILDING - FLOOR PLAN, ELEVATIONS & DETAILS
44	A-2	SEDIMENTATION BASIN BLOWER BUILDING - SECTIONS

WINZLER & KELLY
CONSULTING ENGINEERS

CONDENSING UNIT SCHEDULE

SYMBOL	MFR/MODEL	CAPACITY (TONS)	ELECTRICAL				WEIGHT (LBS)
			VOLTS	PHASE	HZ	MCA	
CU-1	CARRIER 38AH-044-C-6	40	460	3	60	88.9	3550

EXHAUST FAN SCHEDULE

SYMBOL	MFR/MODEL	CFM	ESP (INCHES)	RPM	ELECTRICAL				WEIGHT (LBS)
					VOLTS	PHASE	HZ	HP	
EF-1	GREENHECK CUBE 140-7	2400	.375	1480	460	3	60	3/4	60
EF-5	GREENHECK CUBE 140-5	2150	.375	1350	460	3	60	1/2	60

HEATING BOILER SCHEDULE

SYMBOL	MFR/MODEL	INPUT (BTUH)	OUTPUT (BTUH)	VENT (INCHES)	ELECTRICAL				WEIGHT (LBS)
					VOLTS	PHASE	HZ	–	
B-1	BRYAN F-650	650,000	520,000	12	115	1	60		930

HOT WATER HEATER SCHEDULE

SYMBOL	MFR/MODEL	INPUT (BTUH)	GPH °F RISE	STORAGE (GALS)	VENT (INCHES)	ELECTRICAL				WEIGHT (LBS)
						VOLTS	PHASE	HZ	–	
HWH-1	ACE BOILER B4E	399,000	408/100	325	8	115	1	60		3520

PUMP SCHEDULE

SYMBOL	MFR/MODEL	FLOW (GPM)	HEAD (FT)	ELECTRICAL					WEIGHT (LBS)	SERVICE
				VOLTS	PHASE	HZ	HP	RPM		
CP-1	BELL & GOSSETT 80-1-1/2x1-1/2x7B	42	35	460	3	60	3/4	1750	60	HEATING HOT WATER
CP-2	BELL & GOSSETT 80-1-1/2x1-1/2x7B	42	35	460	3	60	3/4	1750	60	HEATING HOT WATER
CP-11	BELL & GOSSETT SERIES 100	5	8	115	1	60	1/12	1750	21	HOT WATER RETURN

AIR TERMINAL UNIT SCHEDULE

SYMBOL	ROOMS SERVED	ENVIRO-TEC MODEL NO.	INLET SIZE IN	CFM		REHEAT COIL								CONTROL VALVE
				MAX	MIN	MBTUH	EWT, °F	EAT, °F	LAT, °F	GPM	APD, IN	ROWS	WPD, FT	
VAV-1	205,206	SDR-WC	14	2000	600	26.06	180	55	95	1.5	0.18	1	3.6	2-WAY
VAV-2	207	SDR-WC	14	2130	660	26.92	180	55	93	1.5	0.20	1	3.6	3-WAY
CAV-3	208	SDR-WC	6	300	300	–	180	55	–	–	–	–	–	–
VAV-4	202	SDR-WC	14	1800	540	25.11	180	55	98	1.5	0.15	1	3.6	3-WAY
VAV-5	105,106,107	SDR-WC	14	2000	600	26.06	180	55	95	1.5	0.18	1	3.6	2-WAY
VAV-6	109	SDR-WC	14	1760	500	24.41	180	55	100	1.5	0.14	1	3.6	2-WAY
VAV-7	108	SDR-WC	14	2130	600	26.06	180	55	95	1.5	0.20	1	3.6	2-WAY
VAV-8	110	SDR-WC	8	730	300	11.36	180	55	90	1.5	0.20	1	1.6	2-WAY
VAV-9	113,114,115	SDR-WC	14	1800	680	27.19	180	55	92	1.5	0.15	1	3.6	2-WAY
VAV-10	111,112	SDR-WC	6	350	250	9.54	180	55	90	1.5	0.08	1	1.5	2-WAY

AIR HANDLING UNIT SCHEDULE

SYMBOL	AHU-1	AHU-2
MANUFACTURER/MODEL	PACE/PAH	PACE/PAH
ELECTRICAL, V/ø/Hz	460/3/60	460/3/60
WEIGHT, LB	10,100	6490
SUPPLY FAN		
CFM	15,000	20,000
TSP, IN W.G.	5.0	4.5
HP	25	20
WHEEL MODEL	PF30 AF, CL II	PF36 AF, CL II
RETURN FAN		
CFM	10,450	–
TSP, IN W.G.	1.25	–
HP	5	–
WHEEL MODEL	PF30 AF, CL I	–
HEATING COIL		
TYPE	FACE SPLIT	–
EAT, °F DB	32	–
LAT, °F DB	55	–
ROWS	1	–
AIR PRESS. DROP, IN. W.G.	0.08	–
GPM EACH COIL	(2) 12.5	–
WATER PRESS. DROP, FT	0.46	–
COOLING COIL		
TYPE	FACE SPLIT	–
EAT, °F DB/WB	83/65	–
LAT, °F DB/WB	55/54	–
ROWS	5	–
MAX PRESS DROP, IN. W.G.	0.61	–
REFRIGERANT	R-22	–
PREFILTER		
TYPE	DISPOSABLE PANEL	DISPOSABLE PANEL
EFFICIENCY %	30	30
MEDIA	COTTON/SYNTHETIC	COTTON/SYNTHETIC
NUMBER OF FILTERS	(9) 24x24x2	(9) 24x24x2 (3) 12x24x2
WIDTH x HEIGHT, IN	72Wx72H	84Wx72H
VELOCITY, FPM	417	476
PRESSURE DROP, IN W.G.		
(CLEAN)	0.25	0.28
(DIRTY)	0.50	0.50
ODOR FILTER		
TYPE	PUROFIL ODOROXIDANT	PUROFIL ODOROXIDANT
MEDIA	POTASSIUM PERMANGANATE	POTASSIUM PERMANGANATE
NUMBER OF FILTERS	(9) 24x24x20	(9) 24x24x20 (9) 12x24x20
WIDTH x HEIGHT, IN	72Wx72H	84Wx72H
VELOCITY, FPM	420	420
PRESSURE DROP, IN W.G.		
(CLEAN)	0.35	0.40
(DIRTY)	0.35	0.40
BAG FILTER		
TYPE	EXTENDED MEDIA	EXTENDED MEDIA
EFFICIENCY %	85	85
MEDIA	FIBERGLASS	FIBERGLASS
NUMBER OF FILTERS	(9) 24x24x15	(9) 24x24x15 (9) 12x24x15
WIDTH x HEIGHT, IN	72Wx72H	84Wx72H
VELOCITY, FPM	420	420
PRESSURE DROP, IN W.G.		
(CLEAN)	0.32	0.35
(DIRTY)	0.80	0.80

REGISTERED PROFESSIONAL ENGINEER — Timothy B. Smith — No. M025001 — Exp. 9/30/99 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
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IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401
P.O. BOX 6798, SANTA ROSA, CA 95406
PH (707) 523-1010
FAX (707) 527-8679

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	LW
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C50749

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

EQUIPMENT SCHEDULES

DRAWN BY:	LW	DRAWING No.	M-1
SCALE:	NONE	SHEET	OF
DATE:	3-96		

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GENERAL NOTES:

1. INSTALL PIPES, DUCTWORK AND EQUIPMENT AS NOT TO RESTRICT ACCESS TO SERVICE AREAS.
2. FIRESTOP ALL DUCT AND PIPE PENETRATIONS THROUGH RATED ASSEMBLIES, INCLUDING BUT NOT LIMITED TO ROOM 117.
3. CEILINGS ARE LATHE AND PLASTER UNLESS SHOWN OTHERWISE.
4. SCREENED LINES AND NOTES ON DRAWINGS INDICATE EXISTING WORK, FOR REFERENCE ONLY.

MECHANICAL LEGEND

SYMBOL (TWO LINE)	SYMBOL (ONE LINE)	ABBREVIATION	DESCRIPTION
		CD	CEILING DIFFUSER – ARROWS INDICATE THROW
		CER	CEILING EXHAUST OR RETURN REGISTER
		12x12 WSR 150 NC NF 8'–0"	SIZE–WALL SUPPLY REGISTER CFM–NEAR CEILING NEAR FLOOR ELEVATION TO BOTTOM OF OUTLET
		WER	WALL EXHAUST OR RETURN REGISTER
		WEG	WALL EXHAUST OR RETURN GRILLE
		SA	SUPPLY AIR DUCT SECTION
		EA/RA	EXHAUST OR RETURN AIR DUCT SECTION
		OA	OUTSIDE AIR DUCT SECTION
			SQUARE ELBOW WITH DUCT TURNS
			RADIUS ELBOW
	T=		PROPORTIONAL TAKEOFF – T SPECIFIES SIZE OF BRANCH TAKEOFF
		AE	AIR EXTRACTOR
		FLEX	FLEXIBLE DUCT CONNECTION
		VD	MANUAL VOLUME DAMPER
		FSD	COMBINATION FIRE/SMOKE DAMPER
		SL	SOUND LINED DUCT
		FD/FS	FLOOR DRAIN/FLOOR SINK
		RD	ROOF DRAIN
		COTG	CLEANOUT TO GRADE
		FCO	FLOOR CLEANOUT
		WCO	WALL CLEANOUT
		CO	CLEANOUT
		HB	HOSEBIBB
		GV	GATE VALVE
		GC	GAS COCK
			PRESSURE REGULATING VALVE
		U	UNION
		RV	PRESSURE RELIEF VALVE

SYMBOL	ABBREVIATION	DESCRIPTION
A	A	COMPRESSED AIR
	CHS	CHILLED WATER SUPPLY
	CHR	CHILLED WATER RETURN
	CW	NO. 1 WATER (POTABLE)
	CW	NO. 2 WATER (NON–POTABLE)
	CW	NO. 3 WATER (FINAL EFFLUENT)
G	G	GAS
HHWR	HHWR	SPACE HEATING HOT WATER RETURN
HHWS	HHWS	SPACE HEATING HOT WATER SUPPLY
	HW	HOT WATER
	HWR	HOT WATER RETURN
RL	RL	REFRIGERANT LIQUID
RS	RS	REFRIGERANT SUCTION
	SS	SANITARY SEWER – ABOVE GRADE
	SS	SANITARY SEWER – BELOW GRADE
	V	VENT
	CTE	CONNECT TO EXISTING
	BV	BALL VALVE
	CV	CHECK VALVE
T1	T	THERMOSTAT (WITH AIR TERMINAL UNIT NO.)
AV	AV	AUTOMATIC AIR VENT
V	MV	MANUAL AIR VENT
		BALANCING VALVE
		STRAINER
		QUICK GAUGE CONNECTION
		2–WAY CONTROL VALVE
		3–WAY CONTROL VALVE
		THERMOMETER

ABBREVIATION	DESCRIPTION
AD	ACCESS DOOR
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
B	BOILER
BDD	BACKDRAFT DAMPER
BG	BELOW GRADE
B.O.D.	BOTTOM OF DUCT
CAV	CONSTANT AIR VOLUME
CP	CIRCULATING PUMP
CU	CONDENSING UNIT
DTR	DUCT THROUGH ROOF
(E)	EXISTING
EAD	EXHAUST AIR DAMPER
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EL	ELEVATION
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
FF	FINISHED FLOOR
GPM	GALLONS PER MINUTE
HWH	HOT WATER HEATER
IFC	IN FURRED CEILING SPACE
IJS	IN JOIST SPACE
INV	INVERT ELEVATION
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
(N)	NEW WORK
NC	NEAR CEILING
NF	NEAR FLOOR
OAD	OUTSIDE AIR DAMPER
OAL	OUTSIDE AIR LOUVER
POC	POINT OF CONNECTION
RAD	RETURN AIR DAMPER
(RE)	REMOVE EXISTING
UON	UNLESS OTHERWISE NOTED
VAV	VARIABLE AIR VOLUME
VB	VALVE BOX
VTR	VENT THRU ROOF
WPD	WATER PRESSURE DROP
1/P–1	DETAIL 1, SHEET P–1

REGISTERED PROFESSIONAL ENGINEER – DANIEL BOYD KELLY – No. M025081 – Exp. 9/30/97 – MECHANICAL – STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
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PH (707) 523–1010
FAX (707) 527–8679

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	LW
SR. PROJ. ENGR.:	DBR
APPROVED: PRINCIPAL–IN–CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C50749

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

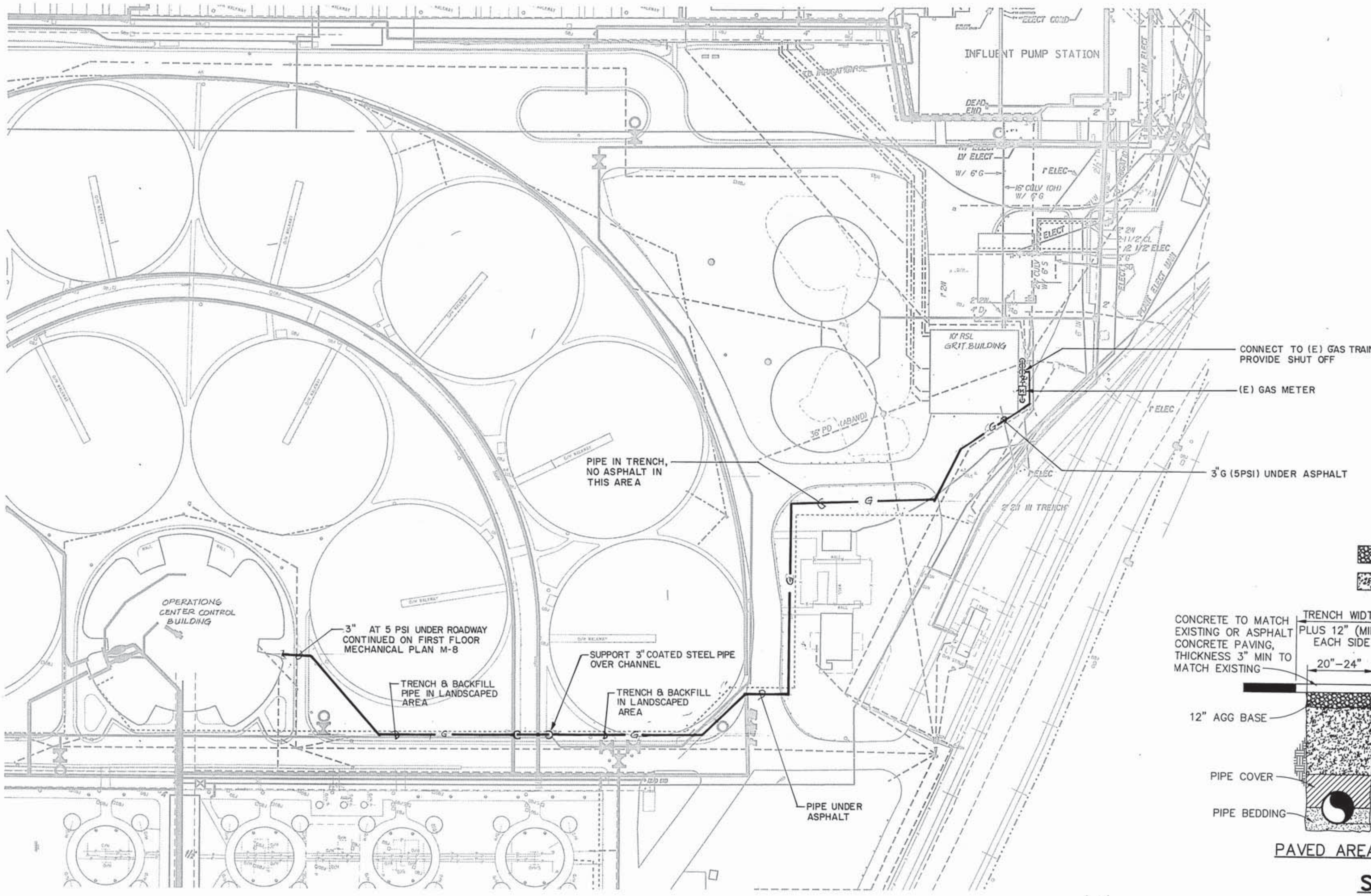
MECHANICAL
LEGEND & NOTES

DRAWN BY:	LW	DRAWING No.	M–2
SCALE:	NONE		
DATE:	3–96	SHEET	OF

Q:\CF\95225701\25701M02.DWG

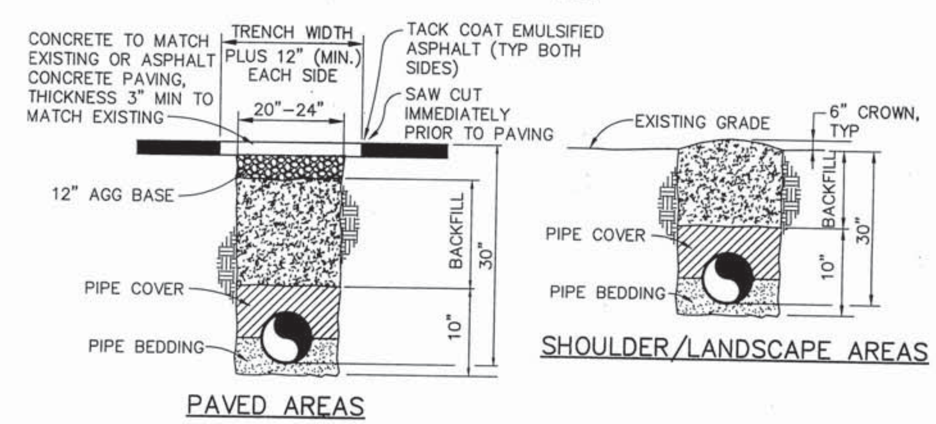
GENERAL NOTES

1. CONTRACTOR SHALL POTHOLE (40" DEEP) AND LOCATE EXISTING YARD PIPING, WATER LINES, CHEMICAL LINES, ELECTRICAL DUCTBANKS ALONG ROADWAY CROSSINGS AND ELECTRICAL SUBSTATION AREAS. SEE ATTACHED REFERENCE DWGS. INCLUDE 20 POTHOLES NECESSARY TO LOCATE DUCTBANKS AND UTILITY LINES. SUBMIT PROPOSED POTHOLE LOCATIONS TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO DIGGING.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. UNLESS DETAILED, SPECIFIED, OR OTHERWISE INDICATED ON THE DRAWINGS, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND NOTES. TYPICAL DETAILS ARE MEANT TO APPLY EVEN WHEN NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS.
4. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF WORK, DETAILS SHALL BE THE SAME AS FOR OTHER SIMILAR WORK.
5. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND DEPTH OF EXISTING PARALLEL OR CROSSING UTILITIES AND NOTIFY THE ENGINEER OF ANY CHANGES REQUIRED IN THE VERTICAL AND/OR HORIZONTAL ALIGNMENT FROM THAT SHOWN ON THE PLANS PRIOR TO PIPE FABRICATION.
6. CONTRACTOR SHALL VERIFY THE LOCATION OF AND PROTECT AND SUPPORT CROSSING UTILITY SERVICE LINES IN ORDER TO ENSURE NO DAMAGE IN A MANNER ACCEPTABLE TO THE UTILITY OWNER DURING EXCAVATION.
7. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY POTENTIAL CONFLICTS WITH PARALLEL AND/OR CROSSING UTILITIES NOT SHOWN ON THE DRAWINGS.
8. VERTICAL CONTROL IS BASED ON EBMUD DATUM, WHICH IS 100' LOWER THAN NATIONAL GEODETIC VERTICAL DATUM (NGVD) OF 1929.
9. THE OWNER OF ANY UTILITY DAMAGED DURING WORK SHALL BE CONTACTED IMMEDIATELY FOR REPAIR AT CONTRACTOR'S EXPENSE.
10. CONTRACTOR SHALL CONTACT UNDERGROUND SERVICES ALERT (PHONE 800-642-2444) FOURTEEN DAYS PRIOR TO WORK IN AN AREA FOR LOCATION OF UNDERGROUND UTILITIES IN THAT AREA.
11. ALL TRAFFIC REFLECTORS AND STRIPING REMOVED AND/OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED IN KIND.
12. PATCH AND REPLACE ASPHALT WHERE PIPES GO UNDER EXISTING ASPHALT OR ROADWAYS.
13. WHERE TRENCHING AND BACKFILLING IN LANDSCAPED AREAS, RETURN LANDSCAPING TO EXISTING CONDITION.
14. SEE SPECIFICATION SECTION 1030 FOR ADDITIONAL DETAILS.



LEGEND

- AGGREGATE BASE
- BACKFILL
- PIPE COVER
- PIPE BEDDING



STANDARD TRENCH DETAIL

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

SITE PLAN

REGISTERED PROFESSIONAL ENGINEER DANIEL BOYD No. M025081 Exp. 9/30/99 MECHANICAL STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401 PH (707) 523-1010
P.O. BOX 6798, SANTA ROSA, CA 95406 FAX (707) 527-8679

NO.	DATE	REVISION	BY	REC.	APP.

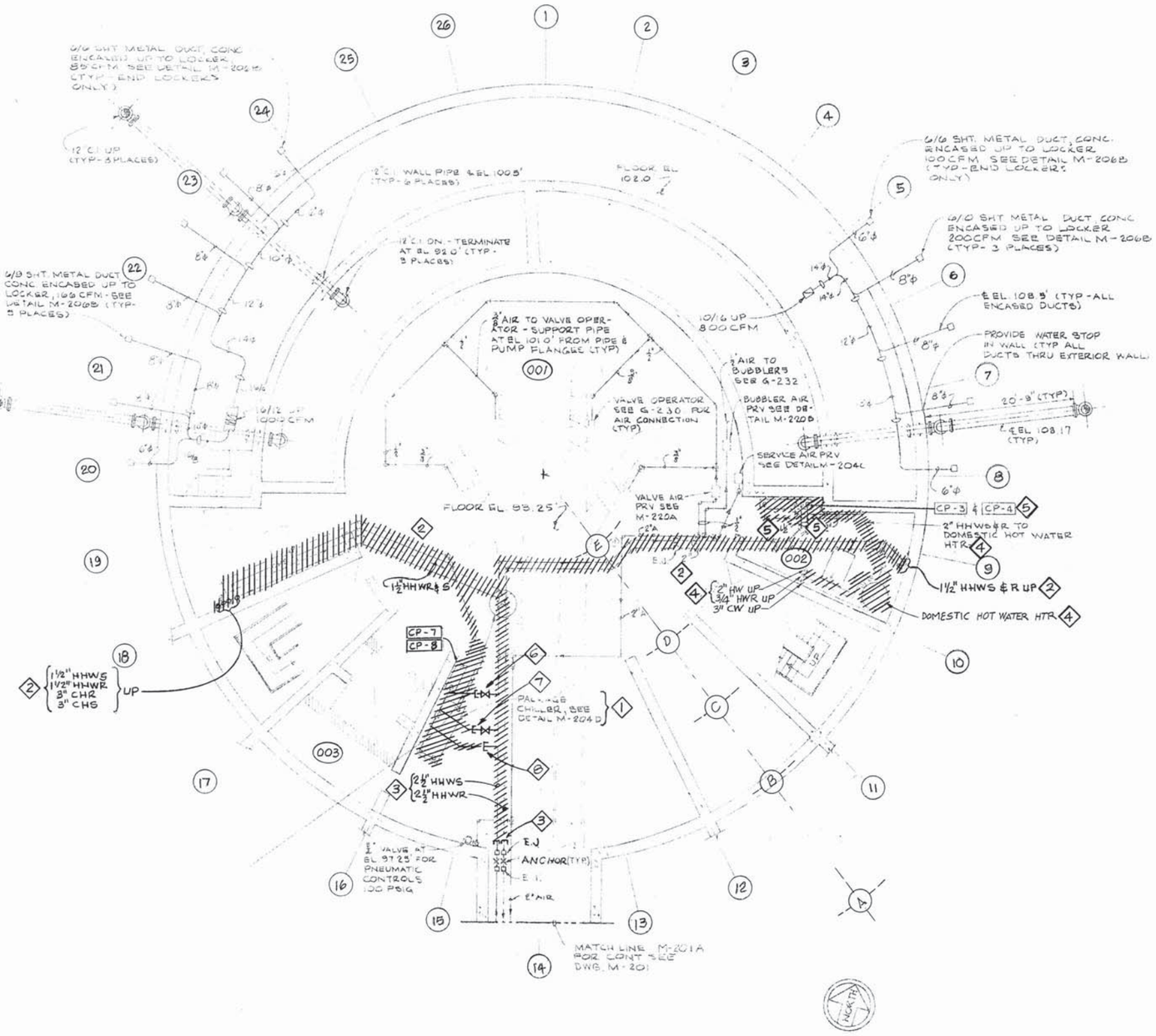
OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	RMM
SR. PROJ. ENGR.:	DAN REITER
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C50769

DRAWN BY:	RMM
SCALE:	1" = 40'
DATE:	3-96

DRAWING No. M-3
SHEET OF



BASEMENT MECHANICAL DEMOLITION PLAN

SCALE 1/8" = 1'-0"

SHEET NOTES:

1. REMOVE EXISTING CHILLER PACKAGE INCLUDING COMPRESSOR, CONDENSER, PUMPS, TANK AND PIPING
2. REMOVE EXISTING HHWS, HHWR, CHS AND CHR PIPING
3. CAP EXISTING HHWS AND HHWR PIPES AND REMOVE PIPING
4. REMOVE EXISTING DOMESTIC HOT WATER HEATER, CIRCULATING PUMP AND PIPING
5. REMOVE EXISTING HHW CIRCULATION PUMPS, PIPING AND CONTROL PANEL
6. REMOVE EXISTING 1-1/2" NO. 3 CW SUPPLY BACK TO SHUT OFF VALVE AND CAP
7. REMOVE EXISTING 2" NO.2 CW MAKE UP BACK TO SHUT OFF VALVE AND CAP
8. REMOVE EXISTING 2-1/2" NO.3 CW DRAIN BACK TO MAIN AND CAP

GENERAL NOTES:

1. INFORMATION SHOWN IS TAKEN FROM RECORD DRAWINGS, CONTRACTOR SHALL VERIFY IN FIELD EXACT CONDITIONS. NOTIFY ENGINEER IMMEDIATELY IF ANY MAJOR DESCREPANCIES OCCUR
2. SCREENED PLAN AND NOTES SHOWN ON THIS SHEET INDICATE EXISTING WORK, FOR REFERENCE ONLY
3. DEMOLISH ALL HVAC PNEUMATIC CONTROL TUBING
4. REVIEW DIVISION 1, SECTIONS 1060 & 1030 FOR ASBESTOS REMOVAL

REGISTERED PROFESSIONAL ENGINEER — DANIEL BOYD RUSSELL — No. M025061 — Exp. 9/30/99 — MECHANICAL — STATE OF CALIFORNIA

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0 —— 1"
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NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE — SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	RMM/DD
SR. PROJ. ENGR.:	DAN REITER
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD

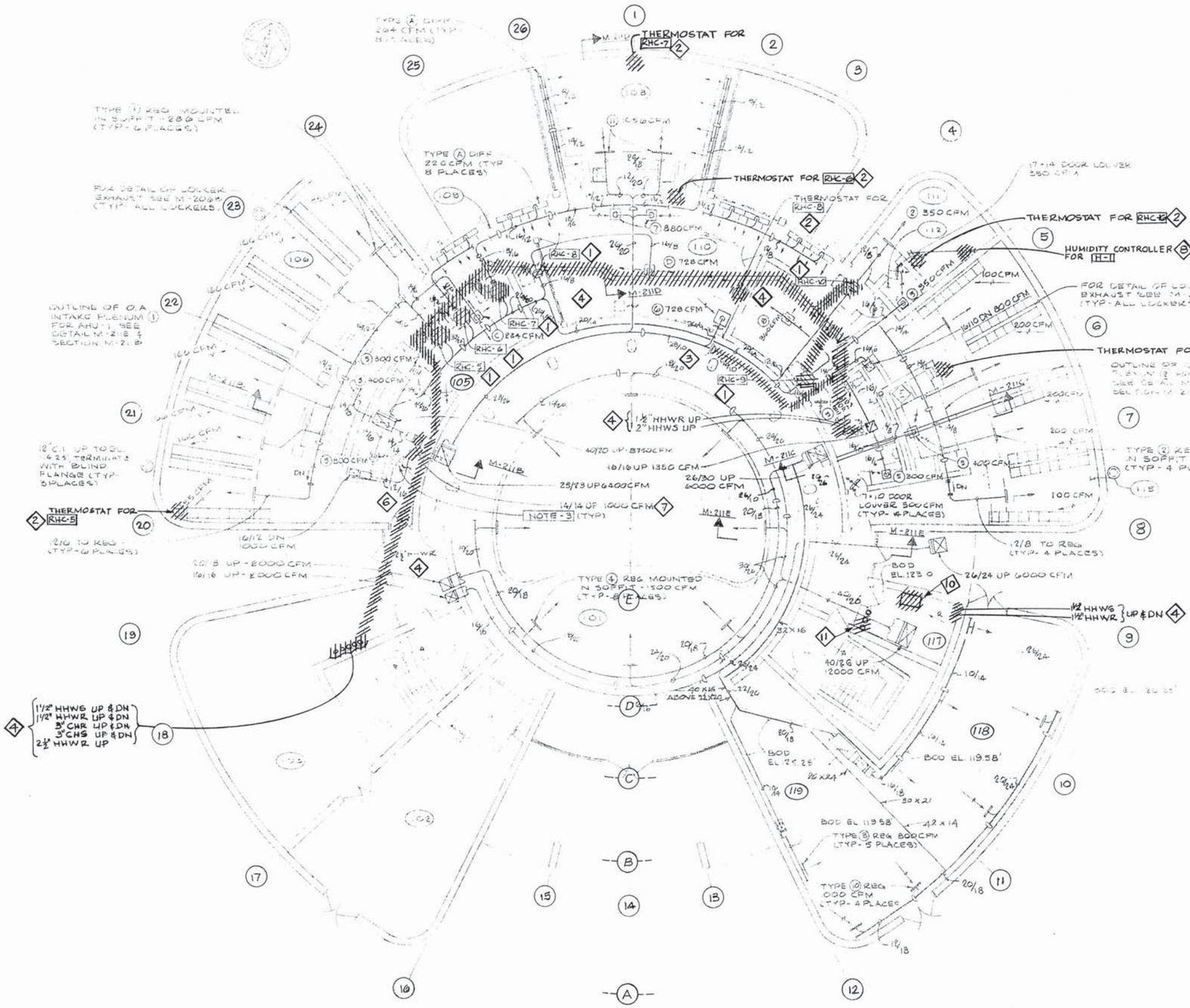
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C56769

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

BASEMENT
DEMOLITION PLAN

DRAWN BY: RMM/DD	DRAWING No. M-4
SCALE: 1/8" = 1'-0"	
DATE: 3-96	SHEET OF



FIRST FLOOR MECHANICAL DEMOLITION PLAN

SCALE 1/8" = 1'-0"

SHEET NOTES:

1. REMOVE EXISTING REHEAT COIL AND ADJACENT DUCTWORK AS REQUIRED FOR THE INSTALLATION OF NEW EQUIPMENT. TYPICAL 6 PLACES.
2. REMOVE EXISTING THERMOSTAT SERVING EXISTING REHEAT COIL. TYPICAL 6 PLACES.
3. CAP EXISTING 28/10 RA DUCT AND REMOVE EXISTING 16/10 RA DUCT BACK TO ABOVE TOILET ROOM
4. REMOVE EXISTING HHWS & HHWR PIPING
5. NOT USED
6. REMOVE EXISTING 12/16 RA ELBOW AND CAP RA DUCT AT SPLIT
7. REMOVE EXISTING 14/14 EXH DUCT UP
8. REMOVE HUMIDITY CONTROLLER
9. NOT USED
10. REMOVE EXISTING SINK AND P TRAP (STACK TO REMAIN). REMOVE 3/4"HW & 3/4"CW, CAP AND CONCEAL ABOVE CEILING 1/4" DRAIN TUBES TO BE RE-ROUTED TO NEW FLOOR SINK
11. REMOVE EXISTING 2"HW & 3/4"HWR FROM BASEMENT LEVEL UP TO ABOVE CEILING FOR RECONNECTION TO NEW HWH

GENERAL NOTES:

1. INFORMATION SHOWN IS TAKEN FROM RECORD DRAWINGS, CONTRACTOR SHALL VERIFY IN FIELD EXACT CONDITIONS. NOTIFY ENGINEER IMMEDIATELY IF ANY MAJOR DESCREPANCIES OCCUR
2. DEMOLISH ALL HVAC PNEUMATIC CONTROL TUBING
3. SCREENED PLAN AND NOTES SHOWN ON THIS SHEET INDICATE EXISTING WORK, FOR REFERENCE ONLY

REGISTERED PROFESSIONAL ENGINEER — Tomas Mok — No. M029[illegible] — Exp. 9/30/99 — MECHANICAL — STATE OF CALIFORNIA

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0 — 1"
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NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	RMM/DD
SR. PROJ. ENGR.:	DAN REITER
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD

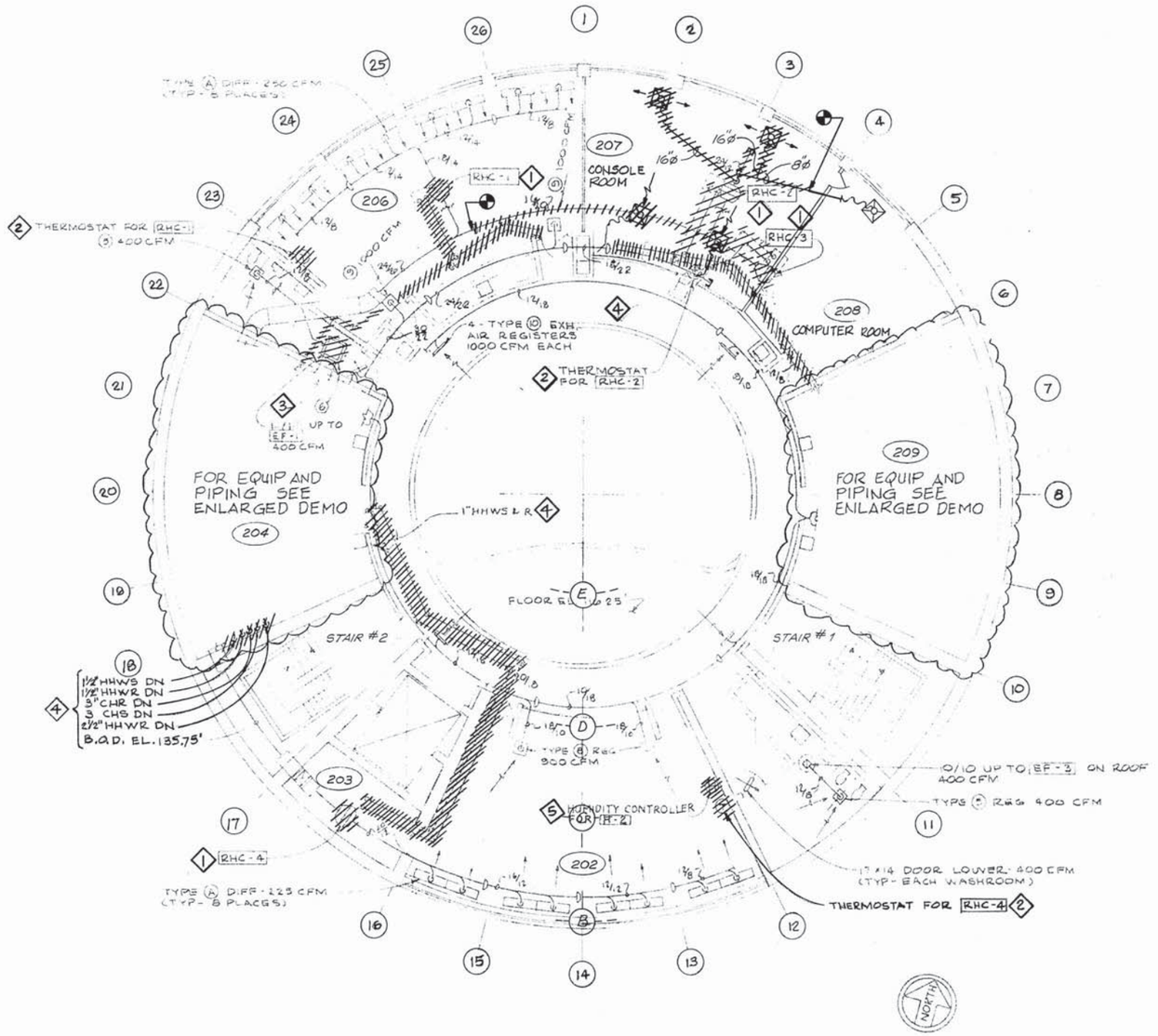
PROJECT MGR. R.P.E. No. — Dana Thomas
PROJECT SUPERVISOR R.P.E. No. C60749 — Jerry Blum

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

FIRST FLOOR
DEMOLITION PLAN

DRAWN BY: RMM/DD	DRAWING No. M-5
SCALE: 1/8" = 1'-0"	
DATE: 3-96	SHEET OF



MEZZANINE LEVEL MECHANICAL DEMOLITION PLAN

SCALE 1/8" = 1'-0"

SHEET NOTES:

1. REMOVE EXISTING REHEAT COIL AND ADJACENT DUCTWORK AS REQUIRED FOR THE INSTALLATION OF NEW EQUIPMENT. TYPICAL 4 PLACES.
2. REMOVE EXISTING THERMOSTAT SERVING EXISTING REHEAT COIL (TYP OF 3), TO BE REPLACED.
3. REMOVE EXISTING 14/14 EXH DUCT; EF-1, FAN TO BE REPLACED.
4. REMOVE ALL HHWS, HHWR, CHS AND CHR PIPING. HHWS AND HHWR PIPING TO REHEAT COILS TO BE REPLACED.
5. REMOVE HUMIDITY CONTROLLER.

GENERAL NOTES:

1. INFORMATION SHOWN IS TAKEN FROM RECORD DRAWINGS, CONTRACTOR SHALL VERIFY IN FIELD EXACT CONDITIONS. NOTIFY ENGINEER IMMEDIATELY IF ANY MAJOR DESCREPANCIES OCCUR
2. DEMOLISH ALL HVAC PNEUMATIC CONTROL TUBING
3. SCREENED PLAN AND NOTES SHOWN ON THIS SHEET INDICATE EXISTING WORK, FOR REFERENCE ONLY

Samuel Boyd No. M022061 Exp. 9/30/99 Mechanical State of California

BAR IS ONE INCH AT FULL SCALE 0 — 1"

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CONSULTING ENGINEERS
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NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	RMM/DD
SR. PROJ. ENGR.:	DAN REITER
APPROVED:	
PRINCIPAL-IN-CHARGE	

ESMUD

PROJECT MGR. R.P.E. No.

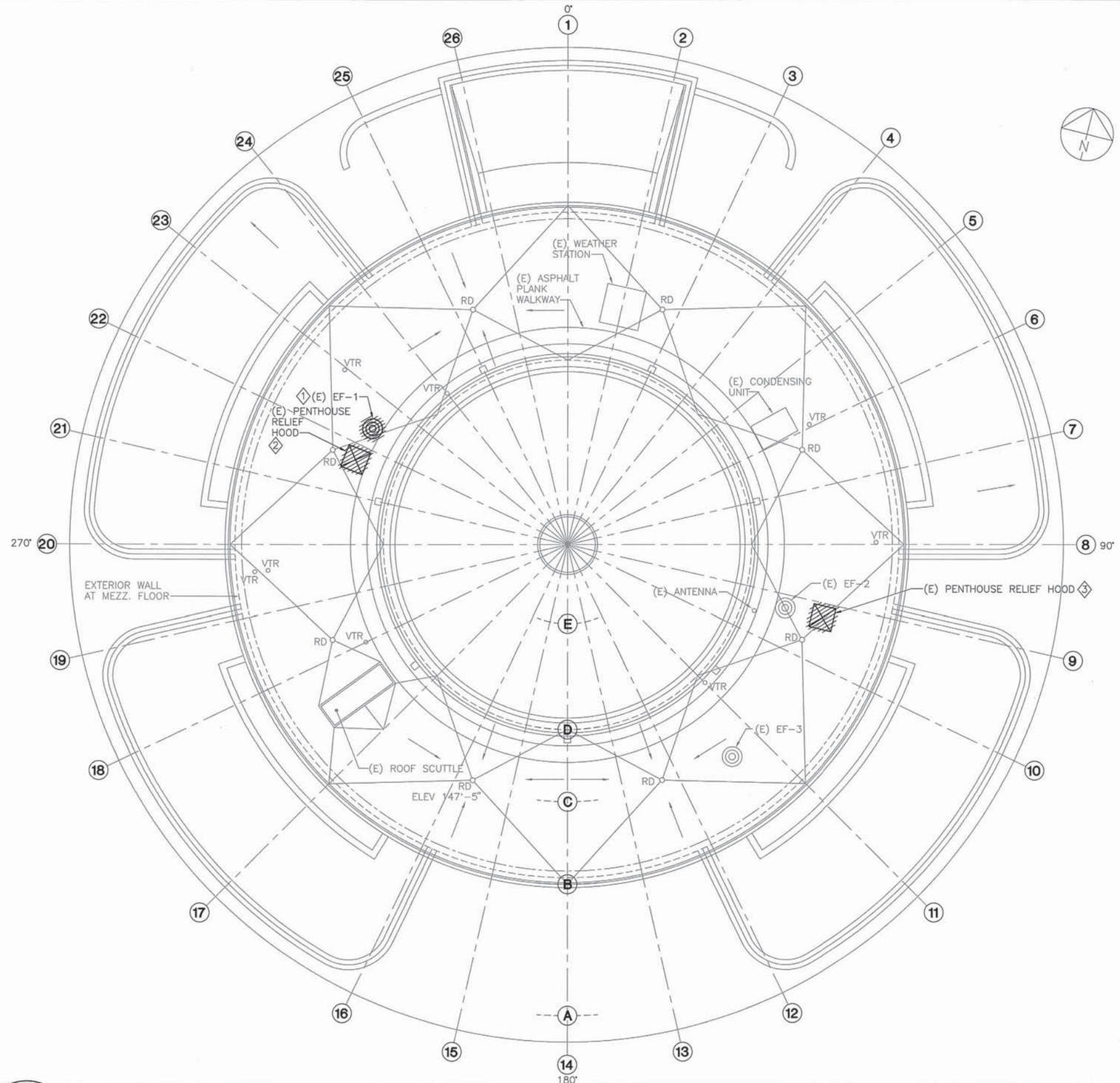
PROJECT SUPERVISOR R.P.E. No. C30788

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

MEZZANINE
DEMOLITION PLAN

DRAWN BY: RMM/DD	DRAWING No. M-6
SCALE: 1/8" = 1'-0"	
DATE: 3-96	SHEET OF



SHEET NOTES:

1. REMOVE (E) EXHAUST FAN EF-1, TO BE REPLACED. SEE ROOF PLAN.
2. REMOVE (E) RELIEF HOOD, TO BE REPLACED WITH LARGER HOOD. SEE STRUCTURAL DRAWINGS AND ROOF PLAN.
3. REMOVE (E) RELIEF HOOD, TO BE REPLACED WITH EF-5. SEE ROOF PLAN.

GENERAL NOTES:

1. INFORMATION SHOWN IS TAKEN FROM RECORD DRAWINGS, CONTRACTOR SHALL VERIFY IN FIELD EXACT CONDITIONS. NOTIFY ENGINEER IMMEDIATELY IF ANY MAJOR DESCREPANCIES OCCUR
2. SCREENED PLAN AND NOTES SHOWN ON THIS SHEET INDICATE EXISTING WORK, FOR REFERENCE ONLY
3. DEMOLISH ALL HVAC PNEUMATIC CONTROL TUBING

REGISTERED PROFESSIONAL ENGINEER — DANIEL BOYD KELLY — No. M025081 — Exp. 9/30/99 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
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CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401
P.O. BOX 6798, SANTA ROSA, CA 95406
PH (707) 523-1010
FAX (707) 527-8679

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	LW
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C 50799

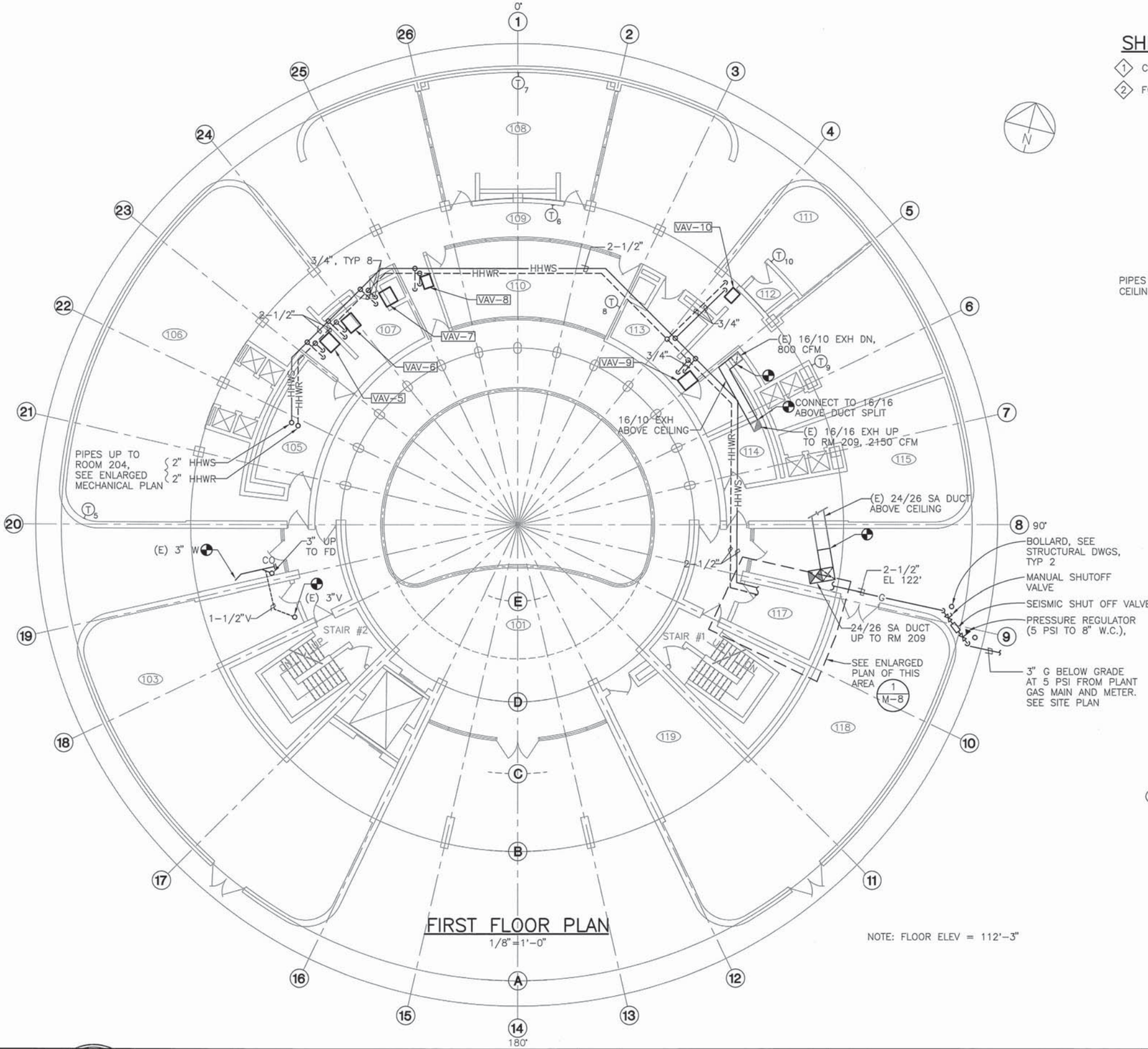
EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

ROOF DEMOLITION PLAN

DRAWN BY:	LW	DRAWING No.	M-7
SCALE:	1/8"=1'-0"		
DATE:	3-96	SHEET	OF

25701M07.DWG

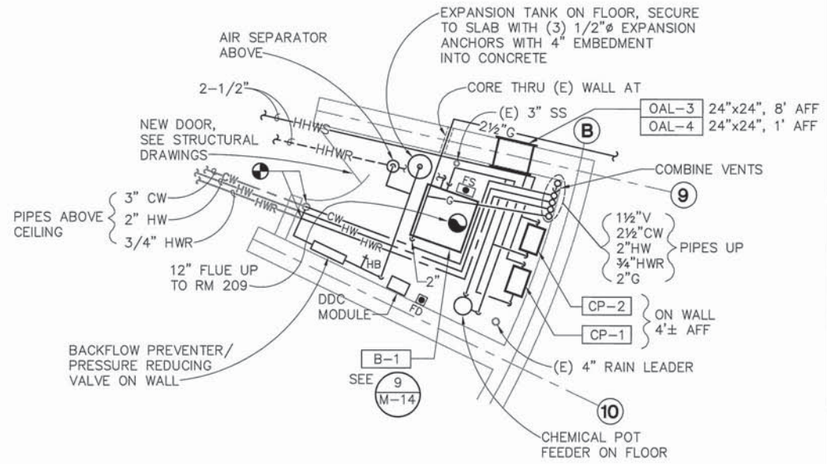


FIRST FLOOR PLAN
1/8"=1'-0"

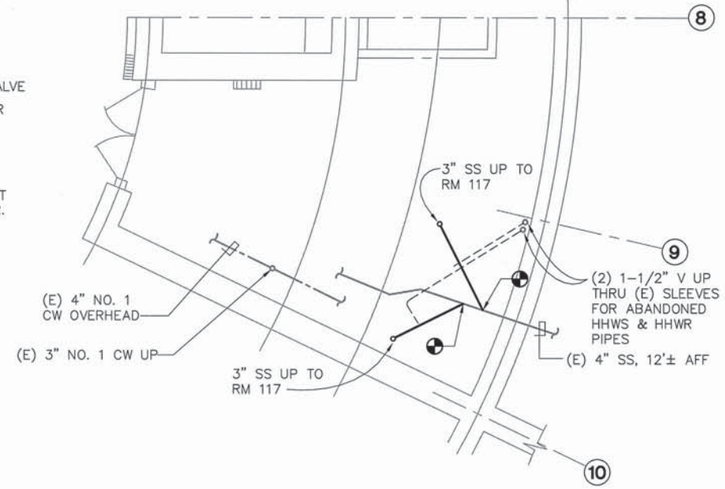
NOTE: FLOOR ELEV = 112'-3"

SHEET NOTES:

1. CEILINGS ARE PLASTER ON LATH, U.O.N.
2. FOR DETAILS OF TYPICAL VAV BOX ASSEMBLY, SEE 2/M-14 4/M-14



1/M-8 ENLARGED PLAN–ROOM 117
1/4"=1'-0"



2/M-8 ENLARGED PLAN–ROOM 002 (BASEMENT)
1/4"=1'-0"

WINZLER & KELLY
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495 TESCONI CIRCLE, SANTA ROSA, CA 95401
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REGISTERED PROFESSIONAL ENGINEER — DONALD BOYD BRINCKLOE — No. M026091 — Exp. 9/30/95 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	LW
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

ENR/JD

PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C 50749

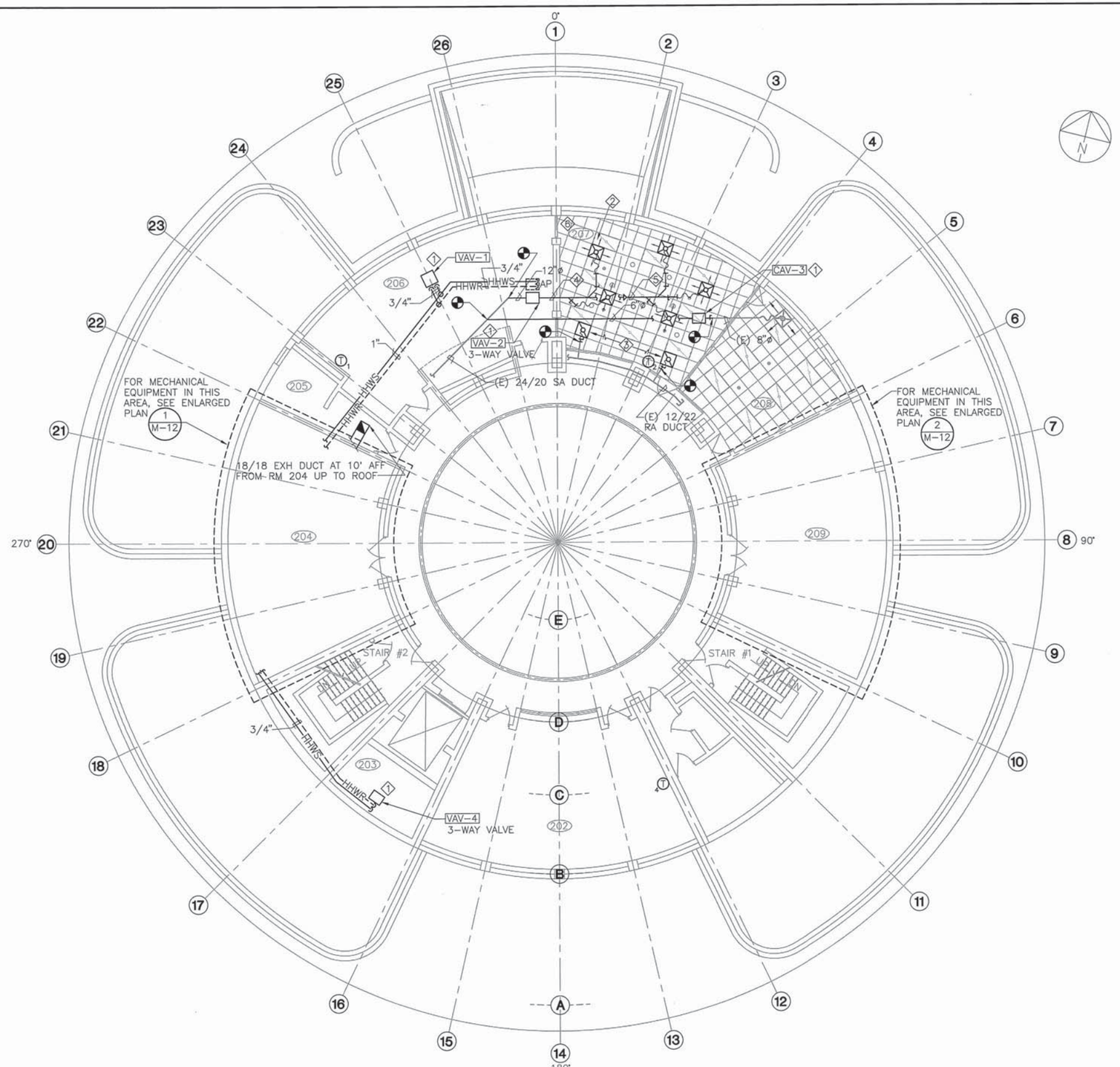
EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

FIRST FLOOR PLAN & PARTIAL PLANS

DRAWN BY:	LW	DRAWING No.	M-8
SCALE:	AS NOTED	SHEET	OF
DATE:	3-96		

25701M08.DWG



SHEET NOTES:

1. CONNECT AIR TERMINAL BOXES TO (E) DUCTWORK. FOR DETAILS OF TYPICAL VAV BOX INSTALLATION, SEE 2/M-14 4/M-14
2. 24"x24" PERFORATED CEILING DIFFUSER, 426 CFM, W/ 12" NECK AND DUCTWORK, TITUS PAS, TYPICAL 5 PLACES.
3. 24"x24" PERFORATED CEILING RETURN, 1065 CFM, W/ 14" NECK AND DUCTWORK, TITUS PAR, TYPICAL 2 PLACES.
4. 18/16 SA DUCT
5. 14/14 SA DUCT
6. EMCS CENTRALIZED HOST STATION COMPUTER

GENERAL NOTES:

ISOLATION OF AHU-1 UPON HALON INITIATION SIGNAL FOR CONSOLE ROOM (RM. 207) AND COMPUTER ROOM (RM. 208) REQUIRED

REGISTERED PROFESSIONAL ENGINEER DANIEL BOYD RICE No. M026091 Exp. 9/30/97 MECHANICAL STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401
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NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	LW
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C50749

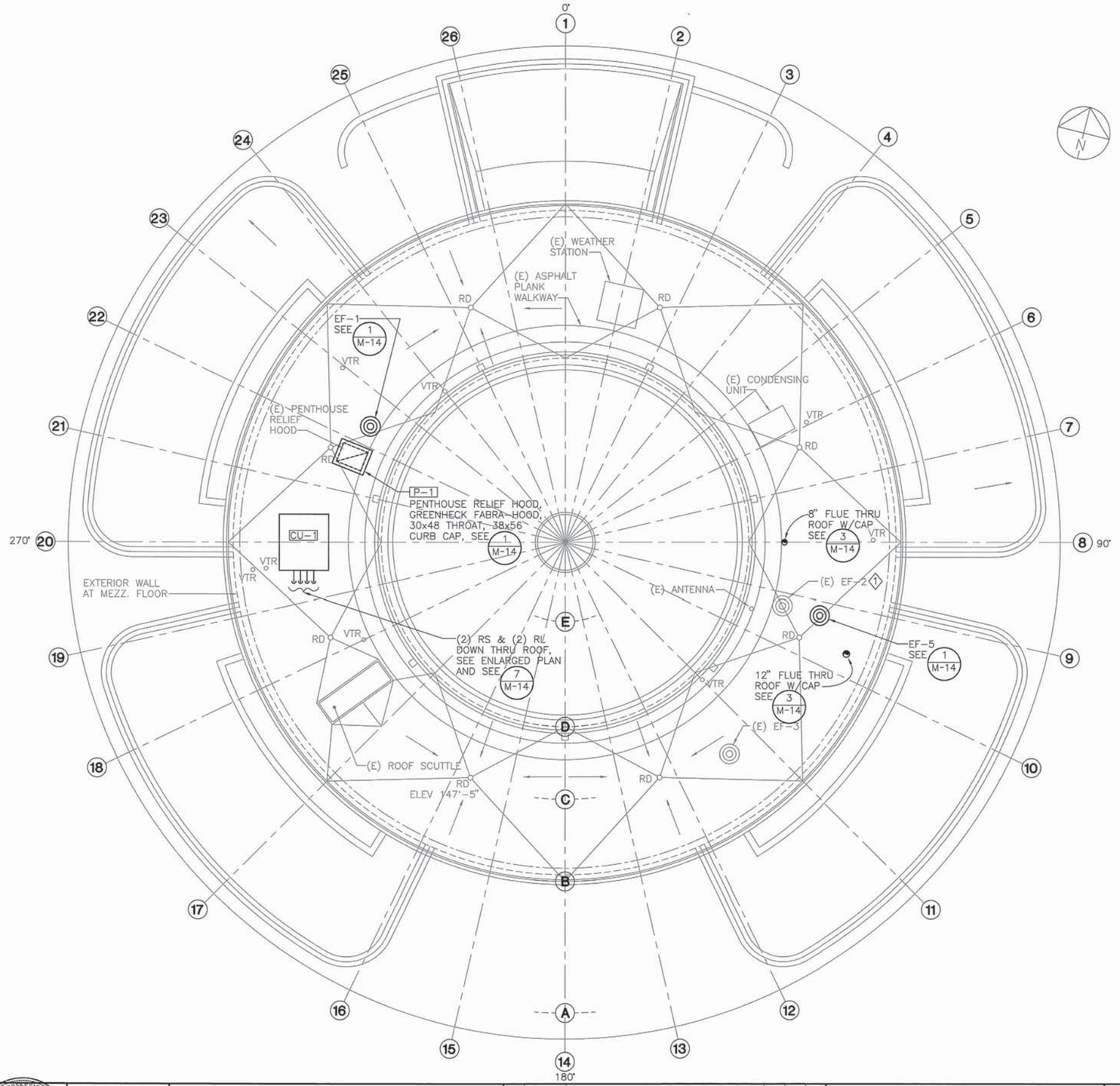
EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

MEZZANINE PLAN

DRAWN BY:	LW	DRAWING No.	M-9
SCALE:	1/8"=1'-0"		
DATE:	3-96	SHEET	OF

25701M09.DWG



SHEET NOTES:

1. ADJUST FAN SPEED OF EF-2 AS REQUIRED TO OBTAIN AIRFLOW INDICATED ON ENLARGED MECHANICAL PLAN. PROVIDE NEW SHEAVES & DRIVES AS REQUIRED.

REGISTERED PROFESSIONAL ENGINEER — DANIEL BOYD — No. M022001 — Exp. 9/30/97 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
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WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401 — PH (707) 523-1010
P.O. BOX 6798, SANTA ROSA, CA 95406 — FAX (707) 527-8679

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	LW
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD

PROJECT MGR. R.P.E. No. — Steven Thomas
PROJECT SUPERVISOR R.P.E. No. C 50749 — Jimmy Brown

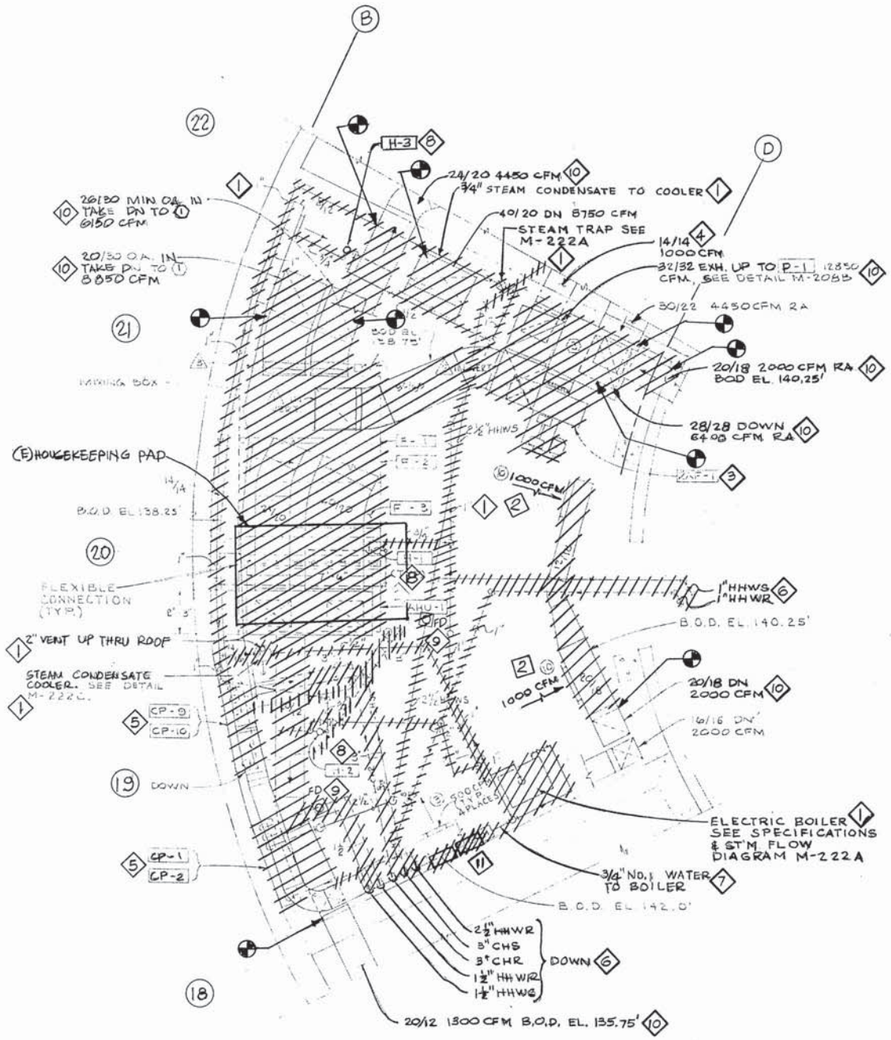
EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

ROOF PLAN

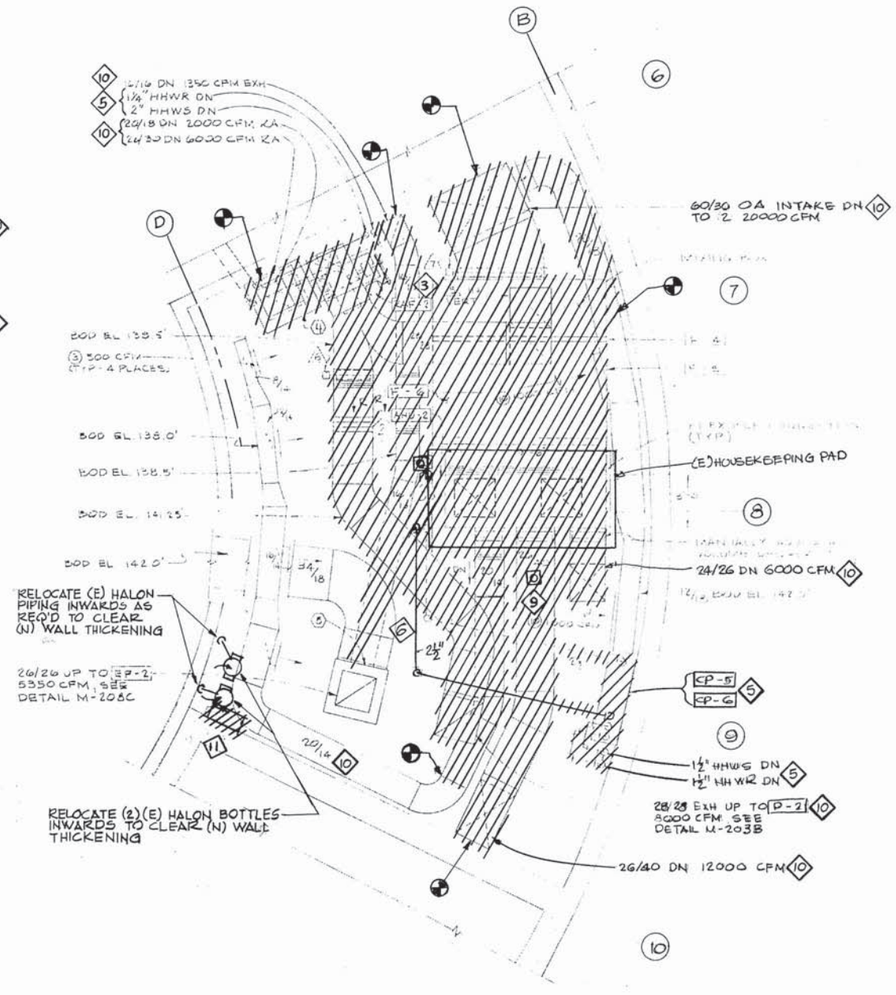
DRAWN BY:	LW	DRAWING No.	M-10
SCALE:	1/8"=1'-0"		
DATE:	3-96	SHEET	OF

25701M10.DWG



DEMOLITION PLAN – RM 204

SCALE 1/4" = 1'-0"



DEMOLITION PLAN – RM 209

SCALE 1/4" = 1'-0"

SHEET NOTES:

1. REMOVE EXISTING ELECTRIC BOILER, CONDENSATE COOLER, STEAM TRAPS (4) AND ALL STEAM AND CONDENSATE PIPING
2. SAVE WER FOR REUSE, TYP OF 2
3. NOT USED
4. REMOVE EXISTING 14/14 EXH DUCT, TO BE REPLACED WITH LARGER DUCT
5. REMOVE EXISTING PUMPS AND PIPING
6. REMOVE EXISTING HHWS, HWR, CHS AND CHR PIPING
7. REMOVE EXISTING NO. 1 CW PIPE, CAP 12" AFF AND LABEL "NO. 1 CW"
8. REMOVE EXISTING HUMIDIFIERS (3)
9. REMOVE EXISTING FLOOR DRAIN AND PATCH FLOOR. NEW FLOOR DRAIN IN NEW LOCATION TO BE CONNECTED TO EXISTING DRAIN PIPES UNDER FLOOR
10. NOT USED
11. REMOVE EXISTING HVAC PNEUMATIC CONTROL PANEL(S)

GENERAL NOTES:

1. INFORMATION SHOWN IS TAKEN FROM RECORD DRAWINGS, CONTRACTOR SHALL VERIFY IN FIELD EXACT CONDITIONS. NOTIFY ENGINEER IMMEDIATELY IF ANY MAJOR DESCREPANCIES OCCUR
2. REMOVE EXISTING DUCT BACK TO POINT SHOWN. DUCTS THROUGH WALL, FLOOR OR CEILING TO BE REPLACED INSIDE MECHANICAL ROOM UNLESS OTHERWISE NOTED
3. SCREENED PLAN AND NOTES SHOWN ON THIS SHEET INDICATE EXISTING WORK, FOR REFERENCE ONLY
4. REMOVE EXISTING RETURN AIR FAN AND ASSOCIATED DUCTS FOR NEW EQUIPMENT LAYOUT
5. REMOVE EXISTING AIR HANDLER, FILTERS, COILS AND ASSOCIATED DUCTS FOR NEW EQUIPMENT LAYOUT
6. REFERENCE SPECIFICATION SECTION 1030–PROJECT CONSTRAINTS FOR ADDITIONAL DETAILS ON HALON RELOCATION

REGISTERED PROFESSIONAL ENGINEER — No. M005097 — Exp. 9/30/99 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401
P.O. BOX 6798, SANTA ROSA, CA 95406
PH (707) 523-1010
FAX (707) 527-8679

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	RMM/DD
SR. PROJ. ENGR.:	DAN REITER
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C 60749

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

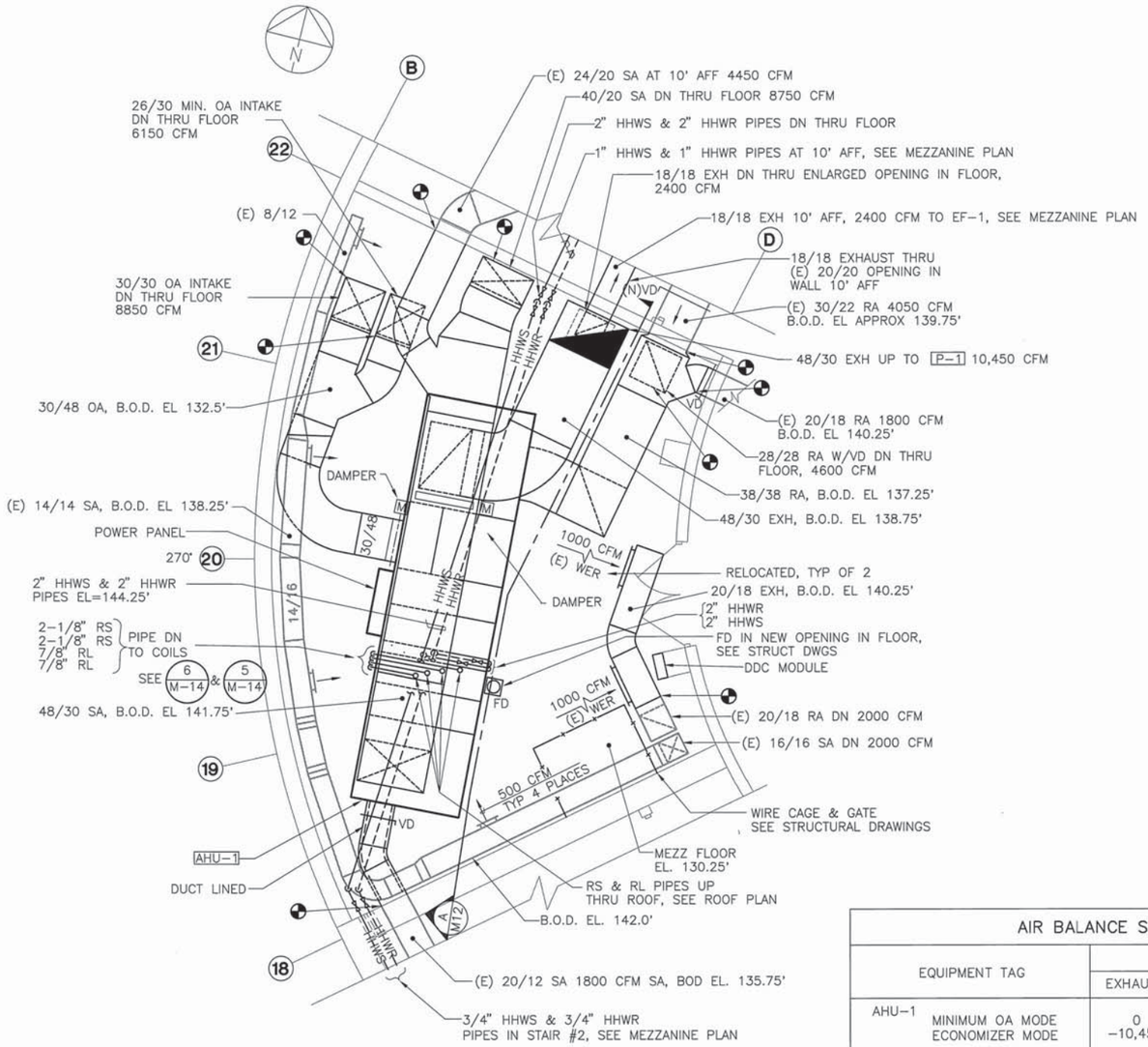
MECHANICAL

ENLARGED DEMOLITION PLAN

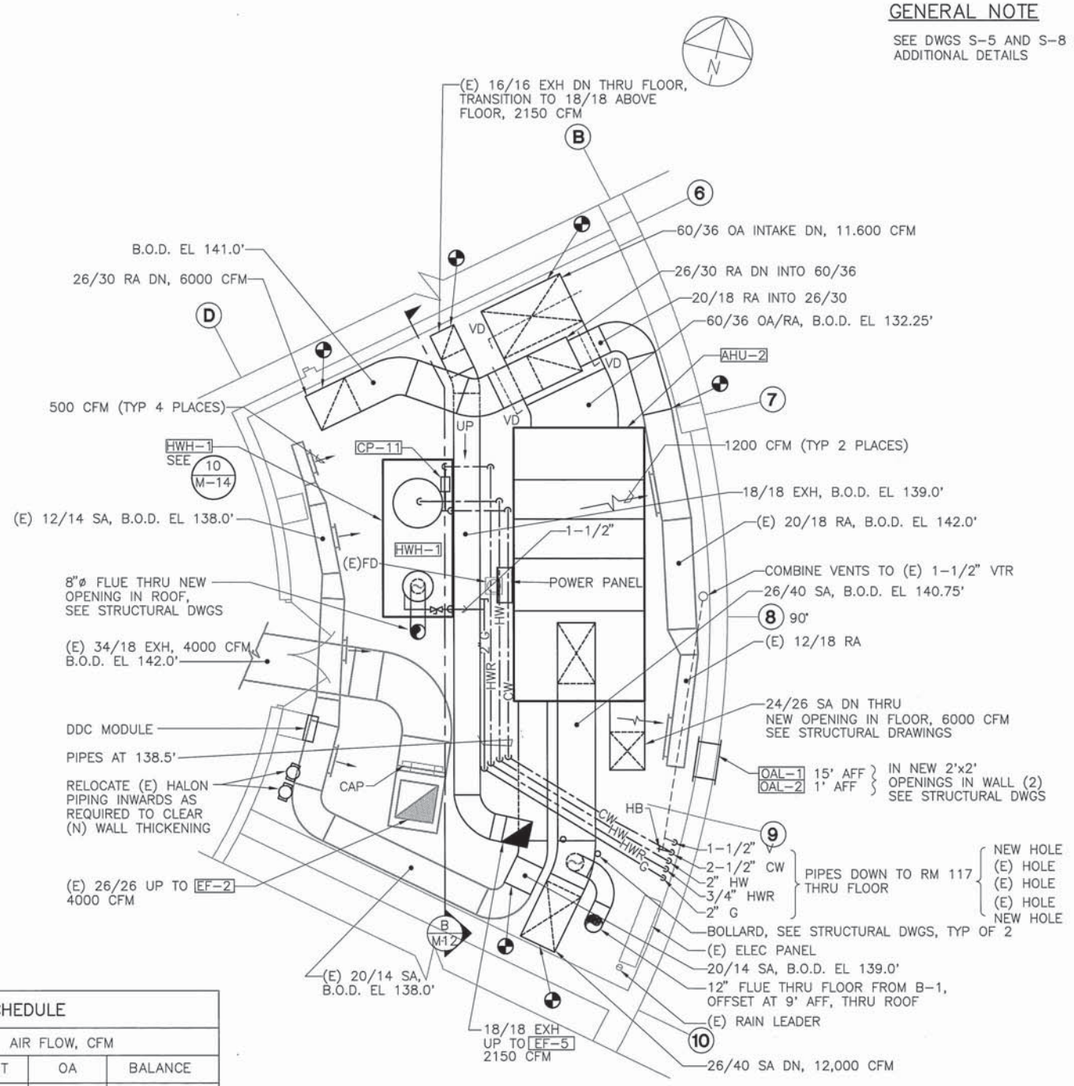
DRAWN BY: RMM/DD	DRAWING No. M-11
SCALE: 1/4" = 1'-0"	
DATE: 3-96	SHEET OF

GENERAL NOTE

SEE DWGS S-5 AND S-8 FOR ADDITIONAL DETAILS



1 M-12 **ROOM NO. 204**
1/4"=1'-0"



2 M-12 **ROOM NO. 209**
1/4"=1'-0"

AIR BALANCE SCHEDULE			
EQUIPMENT TAG	AIR FLOW, CFM		
	EXHAUST	OA	BALANCE
AHU-1 MINIMUM OA MODE ECONOMIZER MODE	0 -10,450	+4,550 +15,000	+4,550
AHU-2	0	+11,600	+11,600
EF-1	-2,400	–	-2,400
EF-2	-4,000	–	-4,000
EF-3	-400	–	-400
EF-5	-2,150	–	-2,150
(E) TUNNEL EXHAUST AIR:	-7,200	–	-7,200
TOTAL			0

DONALD BOYD BERTELSEN REGISTERED PROFESSIONAL ENGINEER No. M022981 Exp. 9/30/97 MECHANICAL STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
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WINZLER & KELLY
CONSULTING ENGINEERS
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PH (707) 523-1010
FAX (707) 527-8679

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	DHD
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

EDMUND
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C 50749

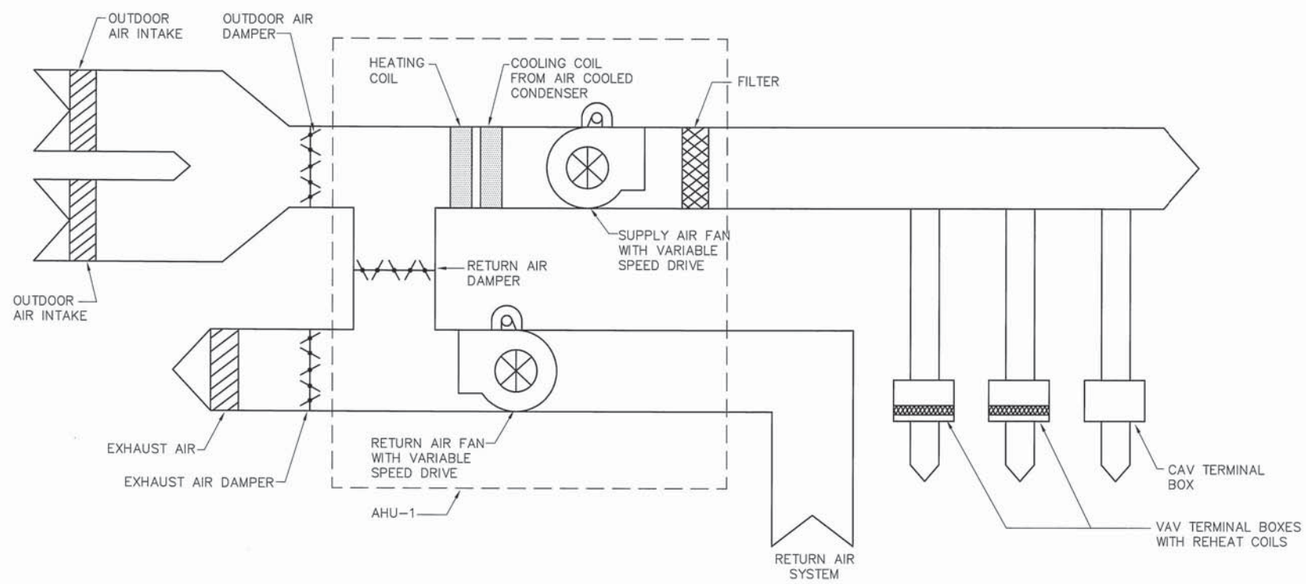
EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

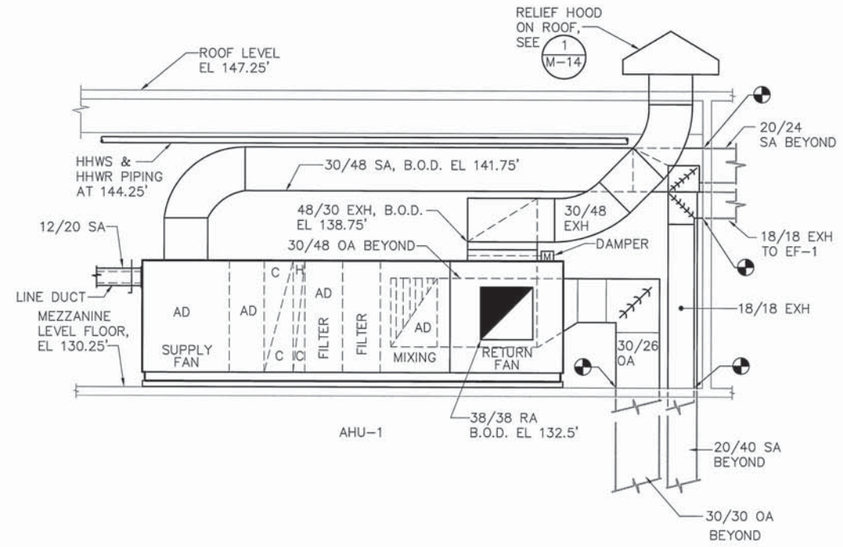
ENLARGED PLANS

DRAWN BY:	DHD	DRAWING No.	M-12
SCALE:	1/4"=1'-0"		
DATE:	3-96	SHEET	OF

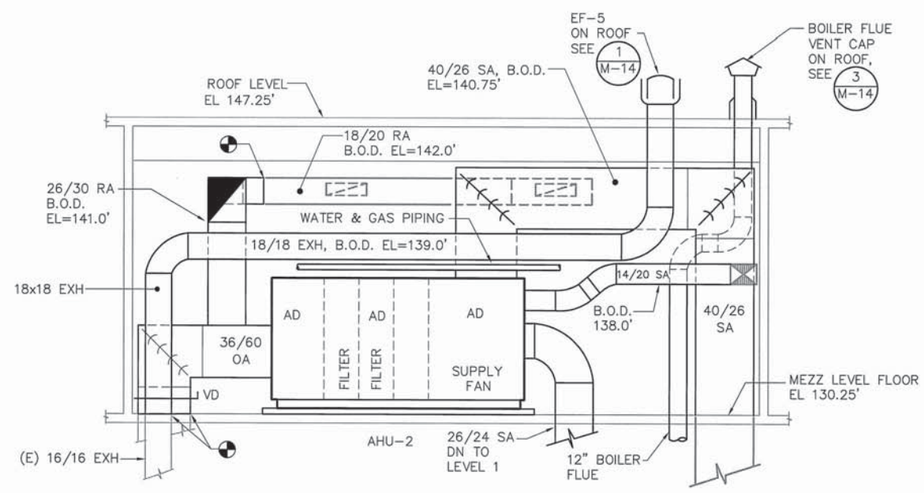
25701M12.DWG



1 / M-13 SYSTEM SCHEMATIC FOR AHU-1
NTS



A / M-13 SECTION WEST AT ROOM 204
1/4"=1'-0"



B / M-13 SECTION EAST AT ROOM 209
1/4"=1'-0"

REGISTERED PROFESSIONAL ENGINEER DANIEL BOTH No. M025091 Exp. 9/30/99 MECHANICAL STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 ——— 1"
IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401
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NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	RMM
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C 50749

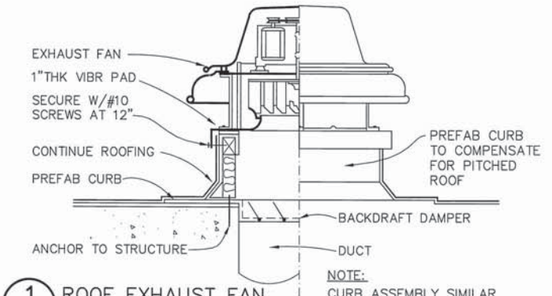
EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

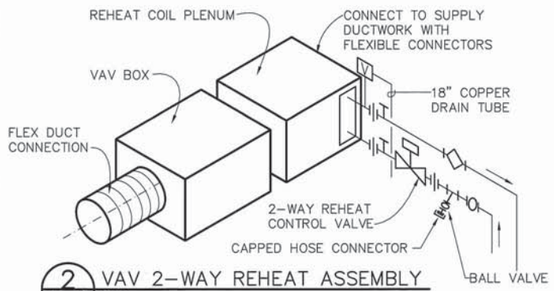
SECTIONS & DETAILS

DRAWN BY:	RMM	DRAWING No.	M-13
SCALE:	SHOWN		
DATE:	3-96	SHEET	OF

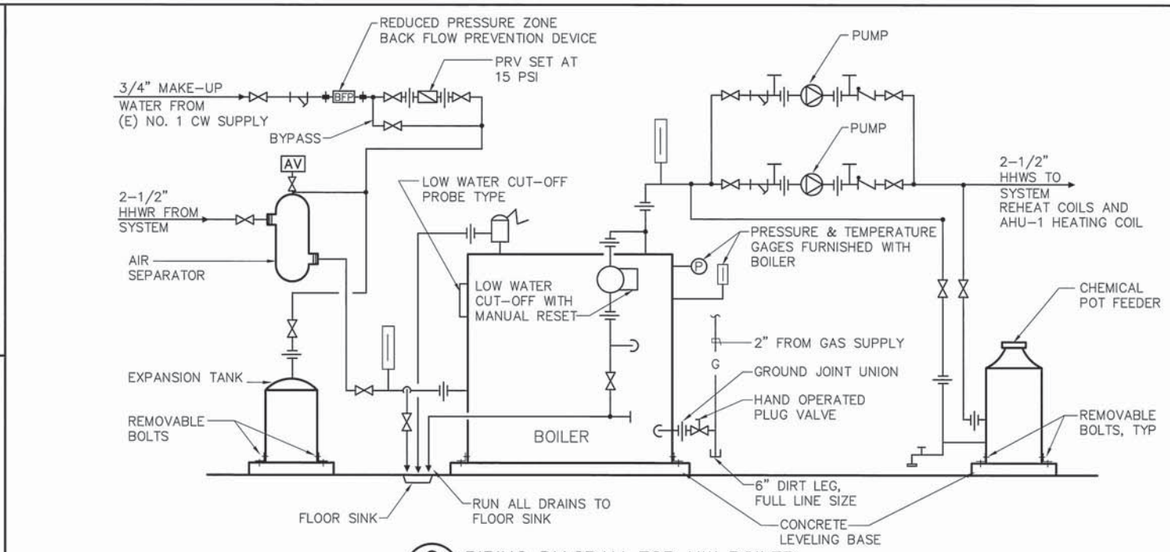
25701M13.DWG



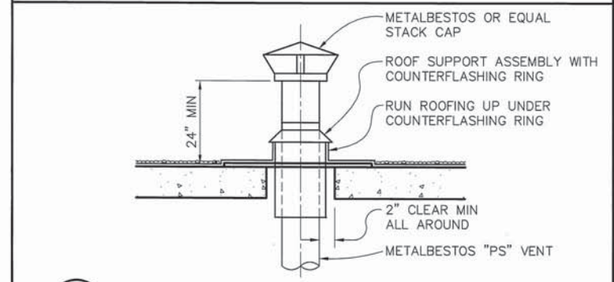
1 M-14 ROOF EXHAUST FAN NTS



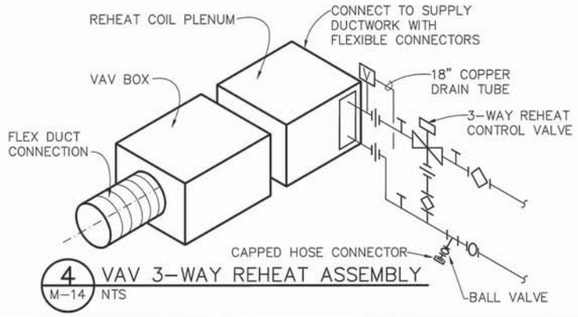
2 M-14 VAV 2-WAY REHEAT ASSEMBLY NTS



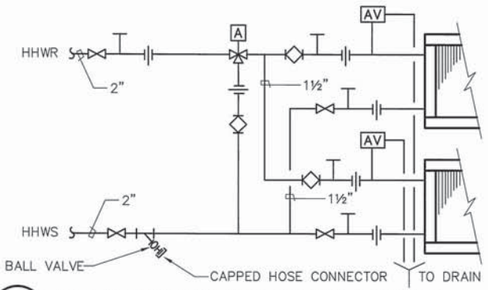
9 M-14 PIPING DIAGRAM FOR HW BOILER NTS



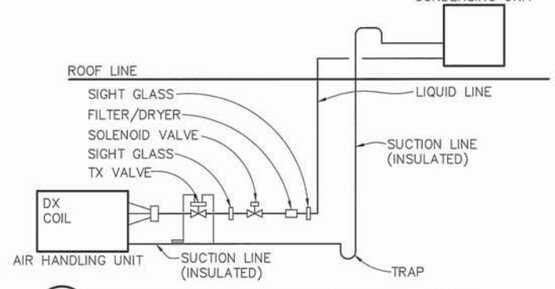
3 M-14 GAS VENT THRU ROOF NTS



4 M-14 VAV 3-WAY REHEAT ASSEMBLY NTS

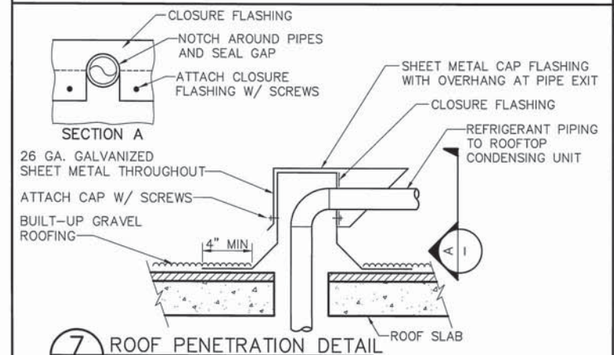


5 M-14 AHU-1 HEATING COIL PIPING DIAGRAM NTS

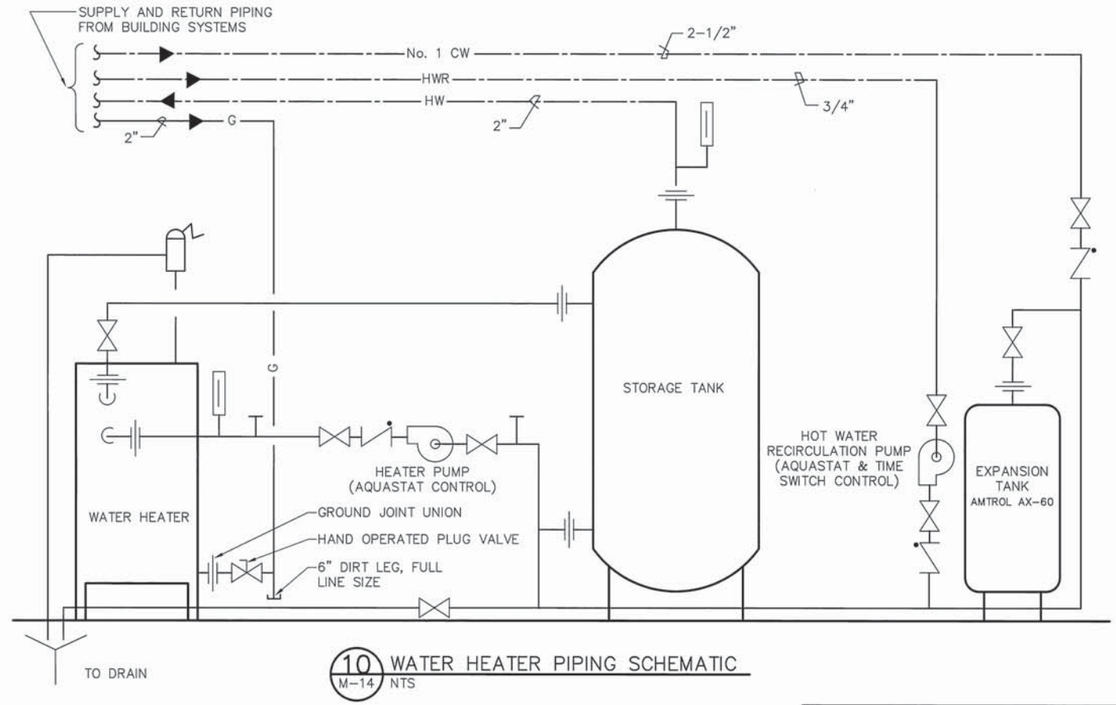


6 M-14 REFRIGERANT PIPING DIAGRAM NTS

NOTE: PIPING SIMILAR FOR EACH COIL CIRCUIT



7 M-14 ROOF PENETRATION DETAIL NTS



10 M-14 WATER HEATER PIPING SCHEMATIC NTS

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

DETAILS

REGISTERED PROFESSIONAL ENGINEER — DONALD DOYLE SMELLEY — No. M025791 — Exp. 9/30/96 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
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WINZLER & KELLY
CONSULTING ENGINEERS
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FAX (707) 527-8679

NO.	DATE	REVISION	BY	REC.	APP.

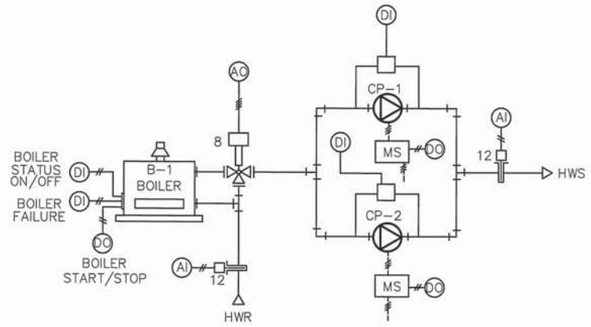
OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	SB
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

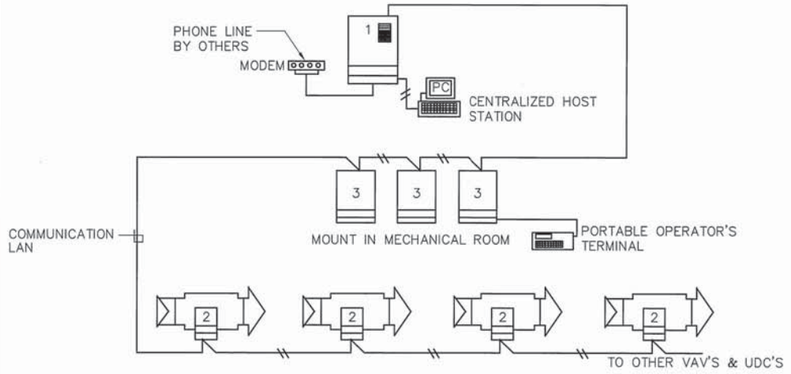
EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C 50799

DRAWN BY:	SB
SCALE:	SHOWN
DATE:	3-96
DRAWING No.	M-14
SHEET	OF

25701M14.DWG



4 HEATING HOT WATER SYSTEM
NTS



1 ENERGY MANAGEMENT CONTROL SYSTEM (EMCS)
NTS

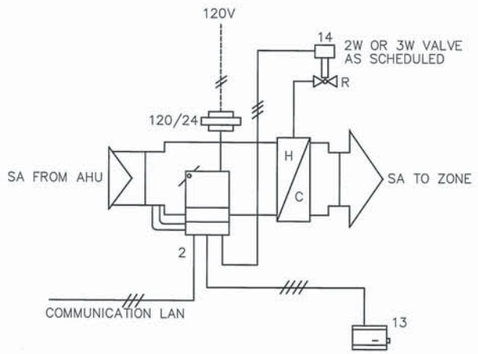
CONTROL SYMBOL LEGEND

- DO — DIGITAL OUTPUT, EMCS
- DI — DIGITAL INPUT, EMCS
- AO — ANALOG OUTPUT, EMCS
- AI — ANALOG INPUT, EMCS
- MS — MAGNETIC STARTER
- INDICATES WIRING BY ELECTRICAL CONTRACTOR
- INDICATES WIRING BY CONTROL/EMCS CONTRACTOR
- APPROX. NO. OF WIRE SHOWN

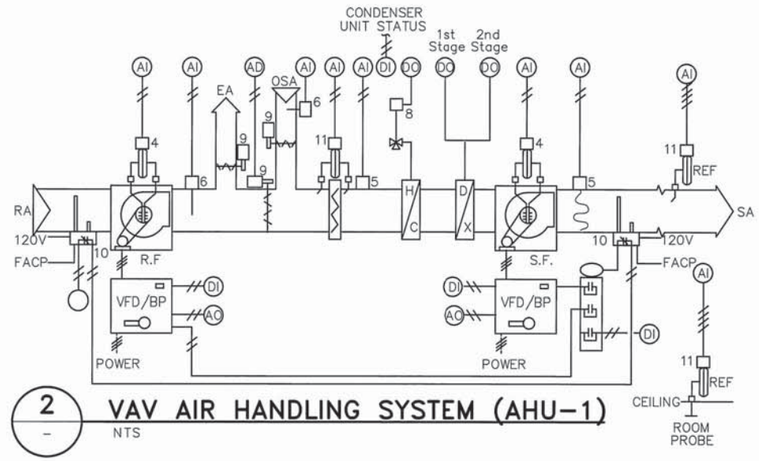
NOTE: SEE SPECIFICATIONS FOR SEQUENCE OF OPERATIONS

CONTROL MATERIAL LEGEND
BARBER COLMAN NETWORK 8000 SYSTEM SPECIFIED

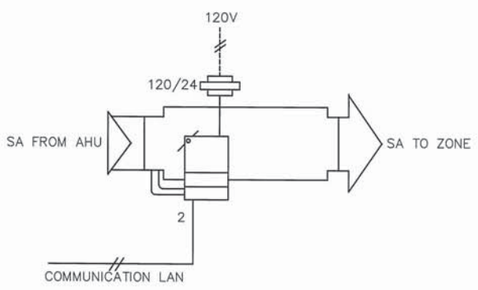
1. (LAC). MULTI–TASKING, 16 BIT MICROPROCESSOR BASED DIRECT DIGITAL CONTROLLER. LAC SHALL UTILIZED NON–VOLATILE MEMORY (EEPROM) FOR PROGRAM STORAGE WITH CAPABILITY FOR 'STAND ALONE' OPERATION. LAC SHALL CONNECT AND COMMUNICATE WITH ALL NETWORK CONTROL DEVICES. LAC SHALL BE FURNISHED WITH A COMPLETE ALPHA–NUMERIC KEYPAD AND LCD DISPLAY FOR MAN–MACHINE INTERFACE. SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS. GLOBAL CONTROL MODULE/PRO VIEW (GCM–86120)
2. (VAVC). PRESSURE INDEPENDENT, DIRECT DIGITAL VAV TERMINAL CONTROLLER UTILIZING NON–VOLATILE MEMORY (EEPROM) FOR PROGRAM STORAGE WITH CAPABILITY OF 'STAND ALONE' OPERATION. CONTROLLER SHALL CONNECT AND COMMUNICATE WITH OTHER NETWORK DEVICES ON THE LAN SYSTEM. CONTROLLER SHALL BE MOUNTED AND CONNECTED TO THE VAV TERMINAL BY THE EMS CONTRACTOR IN THE FIELD. SEE SPECIFICATION FOR FURTHER REQUIREMENTS. MICROFLO 2 (MF2–PIC) FOR INTERIOR OR WITHOUT REHEAT AND MICROFLO 2 (MF2–PID) WITH REHEAT
3. (UDC) MULTI–TASKING, 16 BIT MICRO–PROCESSOR BASED DIRECT DIGITAL CONTROLLER. EACH UDC SHALL UTILIZE NON–VOLATILE MEMORY FOR PROGRAM STORAGE AND SHALL BE CAPABLE OF 'STAND ALONE' OPERATION. THE UDC SHALL CONNECT AND COMMUNICATE WITH OTHER NETWORK 8000 DEVICES ON THE LAN SYSTEM. SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS. MICROZONE 2 (MZ 2–1C)
4. AIR FLOW MEASURING STATION (AFMS) DESIGNED FOR INSTALLATION IN THE INLET CONE (S) OF A CENTRIFUGAL (OR 'PLUG' STYLE) FAN. AFMS SHALL BE FURNISHED WITH AN ELECTRONIC DIFFERENTIAL PRESSURE TRANSMITTER (C–264) FOR SIGNAL INPUT TO THE ENERGY MANAGEMENT SYSTEM. THE ENERGY MANAGEMENT SYSTEM SHALL BE PROGRAMMED TO PROVIDE THE APPROPRIATE SQUARE ROOT EXTRACTION CAPABILITY FOR MEASUREMENT OF FLOW (IN CFM). AIR FLOW ELEMENT AND TRANSMITTER SHALL BE PROVIDED AND INSTALLED BY THE ENERGY MANAGEMENT SYSTEM CONTRACTOR. (FE–205A)
5. DUCT MOUNT ELECTRONIC TEMPERATURE SENSOR WITH A 6' LONG AVERAGING BULB. (TE–205A)
6. DUCT MOUNT ELECTRONIC TEMPERATURE SENSOR, STRAIGHT BULB. (TE–205)
7. CONTROL VALVE, 2–WAY, NORMALLY OPEN, WITH 250 PSI ST. PR. RATING AND 'SCREWED' VALVE BODY. FURNISH WITH A PROP. ELECTRONIC ACTUATOR, 24V. SIZE VALVE FOR A 4–5 PSI PRESS. DROP AT RATED FLOW. (VS–9213)
8. CONTROL VALVE, 3–WAY, 'MIXING' TYPE, WITH 250 PSI STATIC PRESSURE RATING AND 'FLANGED' VALVE BODY. FURNISH WITH A PROPORTIONAL GEAR TRAIN ELECTRONIC ACTUATOR, 24V. SIZE FOR A 4–5 PSI PRESS. DROP AT RATED FLOW. (VS–9313)
9. PROPORTIONAL CONTROL ELECTRONIC DAMPER ACTUATOR, SPRING RETURN WITH A TORQUE RATING OF 90 LB–IN OR BETTER, 24V. ACTUATOR SHALL RESPOND TO A 4–20MA INPUT SIGNAL. ACTUATOR SHALL BE DIRECT COUPLED TO AN EXTENDED DAMPER SHAFT. FURNISH ONE ACTUATOR FOR EACH SAMPER ASSEMBLY, MINIMUM. (MS–6433)
10. DUCT MOUNT SMOKE DETECTOR FURNISHED BY DIVISION 16 FIRE ALARM SYSTEM CONTRACTOR AND MOUNTED WHERE INDICATED BY EMS CONTRACTOR. AHU OPERATION INTERLOCK WIRING BY EMS CONTRACTOR. POWER AND FIRE ALARM INTERLOCK WIRING BY DIVISION 16 FIRE ALARM SYSTEM CONTRACTOR
11. LOW DIFFERENTIAL PRESSURE TRANSMITTER WITH A SOLID STATE STAINLESS STEEL SENSING ELEMENT, TEMPERATURE COMPENSATED. (C–264)
12. TEMPERATURE SENSOR, STRAIGHT BULB WITH INTEGRAL STAINLESS STEEL BULB WELL, PIPE MOUNT. FURNISHED BY EMS CONTRACTOR (BULB WELL INSTALLED IN PIPING BY MECHANICAL CONTRACTOR).(TE–205W)
13. WALL MOUNT ELECTRONIC TEMPERATURE SENSOR WITH A PUSHBUTTON OVERRIDE SWITCH, WHICH WHEN ACTIVATED, WILL PROVIDE TIMED OFF–HOUR OPERATION OF THE CONNECTED AC SYSTEM (SEE SEQ. OF OPERATIONS). SENSOR SHALL BE FURNISHED WITH SET POINT ADJUSTMENT CAPABILITY THAT CAN BE LIMITED IN SOFTWARE AT THE LAC. (TS–90250–850)
14. VAV ZONE REHEAT CONTROL VALVE, 2–WAY OR 3–WAY MIXING TYPE (AS INDICATED) WITH A 250 PSI STATIC PRESSURE RATING, FURNISH WITH A PROPORTIONAL ELECTRONIC ACTUATOR, 24V. SIZE FOR A 4–5 PSI PRESS. DROP AT RATED FLOW. (VS–9213, 2–WAY OR VS–9313, 3–WAY)



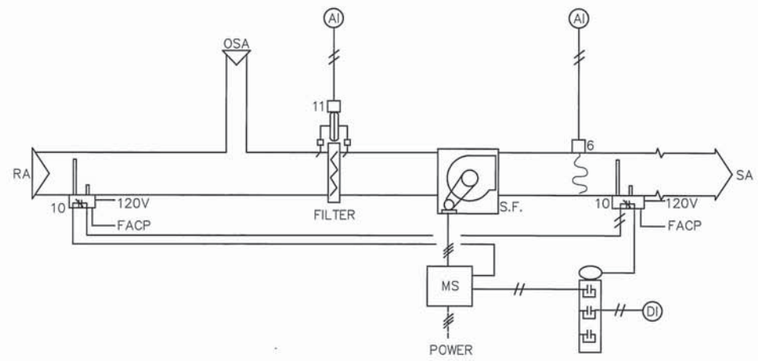
5 VAV ZONE CONTROL
NTS



2 VAV AIR HANDLING SYSTEM (AHU–1)
NTS



6 CONSTANT VOLUME BOX CONTROL FOR COMPUTER ROOM
NTS



3 AIR HANDLING SYSTEM (AHU–2)
NTS

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL

CONTROL SCHEMATIC DIAGRAM

REGISTERED PROFESSIONAL ENGINEER — DANIEL DOYON KELLY — No. M025091 — Exp. 9/30/96 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 — 1"
IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401
P.O. BOX 6798, SANTA ROSA, CA 95406
PH (707) 523–1010
FAX (707) 527–8679

NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	RMM
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL–IN–CHARGE	

EBMUD

PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E. No. C50749

DRAWN BY:	RMM	DRAWING No.	M–15
SCALE:	NONE	SHEET	OF
DATE:	3–96		

25701M15.DWG

NONRESIDENTIAL ENERGY STANDARDS COMPLIANCE (TITLE 24, PART 6, CH. 1)

ENVELOPE MANDATORY MEASURES

- ☐ INSTALLED INSULATING MATERIAL SHALL HAVE BEEN CERTIFIED BY THE MANUFACTURER TO COMPLY WITH THE CALIFORNIA QUALITY STANDARDS FOR INSULATING MATERIAL.
- ☐ ALL INSULATING MATERIALS SHALL BE INSTALLED IN COMPLIANCE WITH THE FLAME SPREAD RATING AND SMOKE DENSITY REQUIREMENTS OF SECTIONS § 1712 AND § 1713 OF THE UBC.
- ☐ ALL EXTERIOR JOINTS AND OPENINGS IN THE BUILDING ENVELOPE THAT ARE OBSERVABLE SOURCES OF AIR LEAKAGE SHALL BE CAULKED, GASKETED, WEATHERSTRIPPED OR OTHERWISE SEALED.
- ☐ SITE CONSTRUCTED DOORS, WINDOWS AND SKYLIGHTS SHALL BE CAULKED BETWEEN THE UNIT AND THE BUILDING, AND SHALL BE WEATHERSTRIPPED (EXCEPT FOR UNFRAMED GLASS DOOR AND FIRE DOORS).
- ☐ MANUFACTURED DOORS AND WINDOWS INSTALLED SHALL HAVE AIR INFILTRATION RATES CERTIFIED BY THE MANUFACTURER PER 2-5316(a)1. AFTER JULY 1, 1993, MANUFACTURED FENESTRATION PRODUCTS MUST BE LABELED FOR U-VALUE ACCORDING TO NFRC PROCEDURES.

- ☐ BUILDING LIGHTING SHUT-OFF
  THE BUILDING LIGHTING SHUT-OFF SYSTEM CONSISTS OF AN AUTOMATIC TIME SWITCH, WITH A ZONE FOR EACH FLOOR: OR
  THE BUILDING IS SEPARATELY METERED AND LESS THAN 5,000 SQUARE FEET; EXCEPT FROM THE SHUT-OFF REQUIREMENT.
- ☐ OVERRIDE FOR BUILDING LIGHTING SHUT-OFF
  THE AUTOMATIC BUILDING SHUT-OFF SYSTEM IS PROVIDED WITH MANUAL, ACCESSIBLE OVERRIDE SWITCH IN SIGHT OF THE LIGHTS. THE AREA OF OVERRIDE IS NOT TO EXCEED 5,000 SF.
- ☐ AUTOMATIC CONTROL DEVICES CERTIFIED
  ALL AUTOMATIC CONTROL DEVICES SPECIFIED ARE CERTIFIED, ALL ALTERNATE EQUIPMENT SHALL BE CERTIFIED AND INSTALLED AS DIRECTED BY THE MANUFACTURER.
- ☐ FLUORESCENT BALLAST AND LUMINARIES CERTIFIED
  ALL FLUORESCENT FIXTURES SPECIFIED FOR THE PROJECT ARE CERTIFIED AND LISTED IN THE DIRECTORY. ALL INSTALLED FIXTURES SHALL BE CERTIFIED.
- ☐ TANDEM WIRING FOR TWO-LAMP BALLAST'S
  ALL ONE AND THREE LAMP FLUORESCENT FIXTURES ARE TANDEM WIRED WITH TWO (2) LAMP BALLAST WHERE REQUIRED BY STANDARD § 132, OR

  ALL THREE LAMP FLUOURESCENT FIXTURES ARE SPECIFIED WITH ELECTRONIC HIGH-FREQUENCY BALLAST'S AND ARE EXEMPT FROM TWO-LAMP TANDEM WIRING REQUIREMENTS.
- ☐ INDIVIDUAL ROOM/AREA CONTROLS
  EACH ROOM AND AREA IN THIS BUILDING IS EQUIPPED WITH A SEPARATE SWITCH OR OCCUPANCY SENSOR DEVICE FOR EACH AREA WITH FLOOR-TO-CEILING WALLS.
- ☐ UNIFORM REDUCTION FOR INDIVIDUAL ROOMS
  ALL ROOMS AND AREAS GREATER THAN 100 SQUARE FEET AND MORE THEN 1.2 WATTS PER SQUARE FOOT OF LIGHTING LOAD SHALL BE CONTROLLED WITH BI-LEVEL SWITCHING FOR UNIFORM REDUCTION OF LIGHTING WITHIN THE ROOM.

- ☐ DAYLIT AREA CONTROL
  ALL ROOMS WITH WINDOWS AND SKYLIGHTS, THAT ARE GREATER THAN 250 SQUARE FEET, AND THAT ALLOW FOR THE EFFECTIVE USE OF DAYLIGHT IN THE AREA SHALL HAVE 50% OF THE LAMPS IN EACH DAYLIT AREA CONTROLLED BY A SEPARATE SWITCH;
  OR
  THE EFFECTIVE USE OF DAYLIGHT THROUGH CANNOT BE ACCOMPLISHED BECAUSE THE WINDOWS ARE CONTINUOUSLY SHADED BY BUILDING ON THE ADJACENT LOT. DIAGRAM OF SHADING DURING DIFFERENT TIMES OF YEAR IS INCLUDED ON PLANS.
- ☐ CONTROL OF EXTERIOR LIGHTS
  EXTERIOR MOUNTED FIXTURES AND SERVED FROM THE ELECTRICAL PANEL INSIDE THE BUILDING ARE CONTROLLED WITH DIRECTIONAL PHOTO CELL CONTROL ON ROOF AND A CORRESPONDING RELAY IN THE ELECTRICAL PANEL.

  THE ABOVE NOTES ARE ONLY EXAMPLES OF WORDING. EACH MANDATORY MEASURE THAT REQUIRES A SEPARATE NOTE SHOULD BE LISTED ON THE PLANS.

EQUIPMENT AND SYSTEM EFFICIENCY

- ☐ ANY APPLIANCE FOR WHICH THERE IS A CALIFORNIA STANDARD ESTABLISHED IN THE APPLIANCE EFFICIENCY STANDARDS MAY BE INSTALLED ONLY IF THE MANUFACTURER HAS CERTIFIED TO THE COMMISSION, AS SPECIFIED IN THOSE REGULATIONS, THAT THE APPLIANCE COMPLIES WITH THE APPLICABLE STANDARD FOR THAT APPLIANCE. INCLUDED ARE ROOM AIR CONDITIONERS, CENTRAL AIR CONDITIONING HEAT PUMPS (REGARDLESS OF CAPACITY, EXCEPT THAT REQUIREMENTS FOR CENTRAL AIR CONDITIONING HEAT PUMPS WITH COOLING CAPACITY OF 135,000 BTU/HR OR MORE APPLY TO HEATING PERFORMANCE BUT NOT COOLING PERFORMANCE), OTHER CENTRAL AIR CONDITIONERS WITH A COOLING CAPACITY LESS THAN 135,000 BTU/HR, FAN TYPE CENTRAL FURNACES WITH INPUT RATE LEASS THAN 400,000 BTU/HR, BOILERS WALL FURNACES, FLOOR FURNACES, ROOM HEATERS, UNIT HEATERS, AND DUCT FURNACES SHALL HAVE BEEN CERTIFIED TO THE CALIFORNIA ENERGY COMMISSION BY ITS MANUFACTURER TO COMPLY WITH THE APPLIANCE EFFICIENCY STANDARDS.
- ☐ THE FOLLOWING SPACE CONDITIONING EQUIPMENT MAY BE INSTALLED ONLY IF THE MANUFACTURER HAS CERTIFIED THAT THE EQUIPMENT MEETS OR EXCEEDS ALL APPLICABLE EFFICIENCY REQUIREMENTS LISTED IN 112 OF THE ENERGY EFFICIENCY STANDARDS: ALL AIR CONDITIONERS, HEAT PUMPS AND CONDENSING UNITS > 135,000 BTU/HR; ALL WATER CHILLERS; ALL GAS-FIRED BOILERS >300,000 BTU/HR; ALL OIL-FIRED BOILERS>225,000 BTU/HR; AND ALL WARM AIR FURNACES AND COMBINATION WARM AIR FURNACES/AIR-CONDITIONING UNITS> 225,000 BTU/HR. FAN TYPE CENTRAL FURNACES SHALL NOT HAVE A PILOT LIGHT.
- ☐ PIPING, EXCEPT THOSE CONVEYING FLUIDS AT TEMPERATURES BETWEEN 60'F AND 105'F, OR WITHIN HVAC EQUIPMENT, SHALL BE INSULATED IN ACCORDANCE WITH STANDARD § 123.
- ☐ AIR HANDLING DUCT SYSTEMS SHALL BE CONSTRUCTED, INSTALLED, SEALED, AND INSULATED AS PROVIDED IN CHAPTER 10 OF THE UNIFORM MECHANICAL CODE.

CONTROLS

- ☐ EACH SPACE CONDITIONING SYSTEM SHALL BE INSTALLED WITH AN AUTOMATIC TIME SWITCH WITH AN ACCESSIBLE MANUAL OVERRIDE THAT ALLOWS OPERATION OF THE SYSTEM DURING OFF-HOURS FOR UP TO 4 HOURS. THE TIME SWITCH SHALL BE CAPABLE OF PROGRAMMING DIFFERENT SCHEDULES FOR WEEKDAYS AND WEEKENDS; INCORPORATE AN AUTOMATIC HOLIDAY "SHUT-OFF" FEATURE THAT TURNS OFF ALL LOADS FOR AT LEAST 24 HOURS, THEN RESUMES THE NORMALLY SCHEDULED OPERATION; AND HAS PROGRAM BACKUP CAPABILITIES THAT PREVENT THE LOSS OF THE DEVICE'S PROGRAM AND TIME SETTING FOR AT LEAST 10 HOURS IF POWER IS INTERRUPTED.
- ☐ EACH SPACE CONDITIONING SYSTEM SHALL BE INSTALLED WITH AN OCCUPANCY SENSOR TO CONTROL THE OPERATING PERIOD OF THE SYSTEM.
- ☐ EACH SPACE CONDITIONING SYSTEM SHALL BE INSTALLED WITH A 4-HOUR TIMER THAT CAN BE MANUALLY OPERATED TO CONTROL THE OPERATING PERIOD OF THE SYSTEM.
- ☐ EACH SPACE CONDITIONING SYSTEM SHALL BE INSTALLED WITH CONTROLS THAT TEMPORARILY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN A SETBACK HEATING THERMOSTAT SETPOINT.
- ☐ EACH SPACE CONDITIONING SYSTEM SHALL BE INSTALLED WITH CONTROLS THAT TEMPORARILY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN A SETBACK COOLING THERMOSTAT SETPOINT.
- ☐ EACH SPACE CONDITIONING SYSTEM SERVING MULTIPLE ZONES WITH A COMBINED CONDITIONED FLOOR AREA MORE THAN 25,000 SQUARE FEET SHALL BE PROVIDED WITH ISOLATION ZONES. EACH ZON SHALL: NOT EXCEED 25,000 SQUARE FEET; SHALL BE PROVIDED WITH ISOLATION DEVICES, SUCH AS VALVES OR DAMPERS, THAT ALLOW THE SUPPLY OF HEATING OR COOLING TO BE SETBACK OR SHUT-OFF INDEPENDENTLY OF OTHER ISOLATION AREAS; AND SHALL BE CONTROLLED BY A TIME CONTROL DEVICE AS DESCRIBED ABOVE.
- ☐ EACH SPACE CONDITIONING ZONE SHALL BE CONTROLLED BY AN INDIVIDUAL THERMOSTATIC CONTROL THAT RESPONDS TO TEMPERATURE WITH THE ZONE. WHERE USED TO CONTROL HEATING, THE CONTROL SHALL BE ADJUSTABLE DOWN TO 55'F OR LOWER, FOR COOLING, THE CONTROL SHALL BE ADJUSTABLE UP TO 85'F OR HIGHER. WHERE USED TO CONTROL BOTH HEATING AND COOLING, THE CONTROL SHALL BE CAPABLE OF PROVIDING A DEAD BAND OF AT LEAST 5'F WITHIN WHICH THE SUPPLY OF HEATING AND COOLING IS SHUT OFF OR REDUCED TO A MINIMUM.
- ☐ THERMOSTATS SHALL HAVE NUMERIC SETPOINTS IN 'F.
- ☐ THERMOSTATS SHALL HAVE ADJUSTABLE SETPOINT STOPS ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL.

- ☐ HEAT PUMPS SHALL BE INSTALLED WITH CONTROLS TO PREVENT ELECTRIC RESISTANCE SUPPLEMENTARY HEATER OPERATION WHEN THE HEATING LOAD CAN BE MET BY THE HEAT PUMP ALONE. ELECTRIC RESISTANCE SUPPLEMENTARY HEATER OPERATION IS PERMITTED DURING TRANSIENT PERIODS, SUCH AS START-UPS AND FOLLOWING ROOM THERMOSTAT SETPOINT ADVANCE, WHEN CONTROLS ARE PROVIDED WHICH USE PREFERENTIAL RATE CONTROL, INTELLIGENT RECOVERY, STAGING, RAMPING, OR SIMILAR CONTROL MECHANISMS DESIGNED TO PRECLUDE THE UNNECESSARY OPERATION OF SUPPLEMENTARY HEATING DURING THE RECOVERY PERIOD. SUPPLEMENTARY HEATER OPERATION IS ALSO PERMITTED DURING DEFROST.

VENTILATION

- ☐ CONTROLS SHALL BE PROVIDED TO ALLOW OUTSIDE AIR DAMPERS OR DEVICES TO BE OPERATED AT THE VENTILATION RATES AS SPECIFIED IN THESE PLANS.
- ☐ GRAVITY OR AUTOMATIC DAMPERS INTERLOCKED AND CLOSED ON FAN SHUTDOWN SHALL BE PROVIDED ON THE OUTSIDE AIR INTAKES AND DISCHARGES OF ALL SPACE CONDITIONING AND EXHUST SYSTEMS.
- ☐ ALL GRAVITY VENTILATING SYSTEMS SHALL BE PROVIDED WITH AUTOMATIC OR READILY ACCESSIBLE MANUALLY OPERATED DAMPERS IN ALL OPENINGS TO THE OUTSIDE, EXCEPT FOR COMBUSTION AIR OPENINGS.
- ☐ AIR BALANCING; ALL SPACE CONDITIONING AND VENTILATION SYSTEMS SHALL BE BALANCED TO THE QUANTITIES SPECIFIED IN THESE PLANS, IN ACCORDANCE WITH THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) PROCEDURAL STANDARDS (1983), OR ASSOCIATED AIR BALANCE COUNCIL (AABC) NATIONAL STANDARDS (1986).
- ☐ OUTSIDE AIR CERTIFICATION: THE SYSTEM SHALL PROVIDE THE MINIMUM OUTSIDE AIR AS SHOWN ON THE MECHANICAL DRAWINGS, AND SHALL BE MEASURED AND CERTIFIED BY THE INSTALLING LICENSED C-20 MECHANICAL CONTRACTOR.

SERVICE WATER HEATING SYSTEMS

- ☐ THE FOLLOWING SERVICE WATER HEATING SYSTEMS AND EQUIPMENT MAY BE INSTALLED ONLY IF THE MANUFACTURER HAS CERTIFIED THAT THE EQUIPMENT MEETS OR EXCEEDS ALL APPLICABLE EFFICIENCY REQUIREMENTS LISTED IN § 113 OF THE ENERGY EFFICIENCY STANDARDS: OIL-FIRED STORAGE TYPES > 105,000 BTU/HR, OIL-FIRED NON-STORAGE TYPES>210,000 BTU/HR, GAS-FIRED NON-STORAGE TYPES > 200,000 BTU/HR.
- ☐ UNFIRED SERVICE WATER HEATER STORAGE TANKS AND BACKUP TANKS FOR SOLAR WATER HEATING SYSTEM SHALL HAVE EITHER: EXTERNAL INSULATION WITH AN INSTALLED R-VALUE OF AT LEAST R-12; INTERNAL AND EXTERNAL INSULATION WITH A COMBINED R-VALUE OF AT LEAST R-16; OR SUFFICIENT INSULATION SO THAT THE HEAT LOSS OF THE TANK SURFACE BASED ON AN 80'F WATER-AIR TEMPERATURE DIFFERENCE SHALL BE LESS THAN 6.5 BTU/HR/SF.
- ☐ IF A CIRCULATING HOT WATER SYSTEM IS INSTALLED, IT SHALL HAVE CONTROL CAPABLE OF AUTOMATICALLY TURNING OFF THE CIRCULATING PUMP(S) WHEN HOT WATER IS NOT REQUIRED.
- ☐ LAVATORIES IN RESTROOMS OF PUBLIC FACILITIES SHALL BE EQUIPPED WITH:
- ☐ OUTLET DEVICES THAT LIMIT THE FLOW OF HOT WATER TO A MAXIMUM OF 0.5 GALLONS PER MINUTE.
- ☐ FOOT ACTUATED CONTROL VALVES, AND OUTLET DEVICES THAT LIMIT THE FLOW OF HOT WATER TO A MAXIMUM OF 0.75 GALLONS PER MINUTE.
- ☐ PROXIMITY SENSOR ACTUATED CONTROL VALVES, AND OUTLET DEVICES THAT LIMIT THE FLOW OF HOT WATER TO A MAXIMUM OF 0.75 GALLONS PER MINUTE.
- ☐ SELF CLOSING VALVES, AND OUTLET DEVICES THAT LIMIT THE FLOW OF HOT WATER TO A MAXIMUM OF 2.5 GALLONS PER MINUTE, AND 0.25 GALLONS/CYCLE (CIRCULATING SYSTEM).
- ☐ SELF-CLOSING VALVES, AND OUTLET DEVICES THAT LIMIT THE FLOW OF HOT WATER TO A MAXIMUM OF 2.5 GALLONS PER MINUTE, AND 0.50 GALLONS/CYCLE (NON-CIRCULATING SYSTEM).
- ☐ SELF-CLOSING VALVES, AND OUTLET DEVICES THAT LIMIT THE FLOW OF HOT WATER TO A MAXIMUM OF 2.5 GALLONS PER MINUTE, AND 0.75 GALLONS/CYCLE (FOOT SWITCHES AND PROXIMITY SENSOR CONTROLS).
- ☐ LAVATORIES IN RESTROOM OF PUBLIC FACILITIES SHALL BE EQUIPPED WITH CONTROLS TO LIMIT THE OUTLET TEMPERATURE TO 110'F.

POOLS AND SPAS

- ☐ POOL AND/OR SPA HEATING SYSTEMS OR EQUIPMENT SHALL BE INSTALLED ONLY IF THE MANUFACTURER HAS CERTIFIED THAT THE SYSTEM OR EQUIPMENT MEETS THE REQUIREMENTS OF § 114 AND § 115 OF THE ENERGY EFFICIENCY STANDARDS.
  EQUIPMENT SHALL NOT HAVE A PILOT LIGHT.
  ALL SUCH SYSTEMS SHALL BE INSTALLED WITH AT LEAST 36" OF PIPE BETWEEN THE FILTER AND THE HEATER TO ALLOW FOR THE FUTURE ADDITION OF SOLAR HEATING EQUIPMENT.
- ☐ A COVER SHALL BE PROVIDED FOR OUTDOOR POOLS.
- ☐ A COVER SHALL BE PROVIDED FOR OUTDOOR SPAS.
- ☐ POOLS SHALL BE INSTALLED WITH DIRECTIONAL INLETS THAT ADEQUATELY MIX THE POOL WATER.
- ☐ POOL CICULATION PUMP(S) SHALL BE PROVIDED WITH TIME SWITCH THAT ALLOWS THE PUMP TO BE SET TO RUN IN THE OFF-PEAK ELECTRICAL DEMAND PERIOD, AND FOR THE MINIMUM TIME NECESSARY TO MAINTAIN THE WATER IN THE CONDITIONS REQUIRED BY APPLICABLE PUBLIC HEALTH STANDARDS.

REGISTERED PROFESSIONAL ENGINEER — DANIEL BOYD — No. M025791 — Exp. 9/30/97 — MECHANICAL — STATE OF CALIFORNIA

BAR IS ONE INCH AT FULL SCALE
0 —— 1"
IF NOT ONE INCH ON THIS SHEET, SCALE ACCORDINGLY

WINZLER & KELLY
CONSULTING ENGINEERS
495 TESCONI CIRCLE, SANTA ROSA, CA 95401
P.O. BOX 6798, SANTA ROSA, CA 95406
PH (707) 523-1010
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NO.	DATE	REVISION	BY	REC.	APP.

OPERATIONS CENTER
HVAC UPGRADE – SD 220

DESIGNED BY:	MNS
DESIGN CHECKED BY:	DBR
DRAWN BY:	DHD
SR. PROJ. ENGR.:	DBR
APPROVED:	
PRINCIPAL-IN-CHARGE	

EBMUD
PROJECT MGR. R.P.E. No.
PROJECT SUPERVISOR R.P.E.'s No. C 50749

EAST BAY MUNICIPAL UTILITY DISTRICT
SPECIAL DISTRICT No. 1
OAKLAND, CALIFORNIA

MECHANICAL
TITLE 24

DRAWN BY:	DHD	DRAWING No.	M-16
SCALE:	NONE	SHEET	OF
DATE:	3-96		

25701M16.DWG

LEGEND

AHU =	AIR HANDLING UNIT
CM =	COIL MODULE
RH =	REHEAT COIL
RF =	RECIRC. FAN
EF =	EXHAUST FAN
FEF =	FUME EXHAUST FAN
CH =	CANOPY HOOD
FH =	FUME HOOD

AHU SCHEDULE

TAG	MANUFACTURER MODEL #	CFM	REMARKS
AHU-1	PACE A-15 B1	5400	
AHU-2	PACE A-16 B1	6300	
AHU-3	PACE A-15 B1	4320	
AHU-4	PACE A-12 B1	2600	
AHU-5	PACE A-15 B1	4410	REFURBISHED
AHU-6	PACE A-15 B1	4620	REFURBISHED
AHU-7	PACE A-13 B1	3500	REFURBISHED
AHU-8	PACE A-12 B1-SWS1	1480	
AHU-9	TRANE	2480	
AHU-10	TRANE	4160	
AHU-11	PACE A-13 B1	3870	50% REFURBISHED
AHU-12	PACE A-15 B1	5210	50% REFURBISHED
AHU-13	PACE A-24 AF	14200	
AHU-14	PACE A-12 B1-N	1445	
AHU-15	PACE A-12 B1-SWS1	1505	
AHU-16	PACE A-16 B1	6220	REFURBISHED
AHU-17	PACE A-15 B1	4445	
AHU-18	PACE A-16 B1	5230	REFURBISHED
AHU-19	PACE A-12 B1	2875	REFURBISHED

PUMP SCHEDULE

TAG	SERVICE	GPM	HP
3	CHILL WATER	160	7.5
4	CHILL WATER	160	7.5
5	EQUIP COOLING WATER	27	2
6	EQUIP COOLING WATER	27	2

PRE CHARGED EXPANSION TANK SCHEDULE

TAG	SERVICE	GAL
ET-2	CHILL WATER	33.6
ET-3	COOLING WATER	10.9

CHILLER SCHEDULE

TAG	CAPACITY (TONS)
1	200
2	11

FAN SCHEDULE

TAG	CFM
RF-1	3910
RF-2	2590
RF-3	3750
RF-4	4060
RF-5	2920
RF-6	2830
RF-7	2100
RF-8	2240
RF-9	3660
EF-1	2150
EF-2	1180
EF-3	4300
EF-4	2750
EF-5	300
EF-6	2000
EF-7	2000
EF-8	2820
EF-9	2000
EF-10	750
EF-11	1050
EF-13	600
EF-14	1300
EF-15	2550
EF-16	1000

FUME HOOD EXHAUST FAN SCHEDULE

TAG	CFM
FEF-1	1250
FEF-2	1250
FEF-3	8420
FEF-4	8420
FEF-5	8420
FEF-6	8420
FEF-7	8420
FEF-8	8420
FEF-9	760
FEF-10	1250
FEF-11	2960
FEF-12	2960
FEF-13	1710
FEF-14	1000
FEF-15	760
FEF-16	1000
FEF-17	1250
FEF-18	1760
FEF-19	1760
FEF-20	1760
FEF-21	1000
FEF-22	950
FEF-23	1250
FEF-24	2500

MISC. EQUIP

TAG	REMARKS
COLD ROOM CONDENSOR	COOLS WALK IN FREEZER
CONDENSING UNIT 1	SERVES MICROSCOPY ROOM
CONDENSING UNIT 2	SERVES AHU 10
UN-TAGGED MINI SPLIT	SERVES AB/LAB SERVER ROOM
UN-TAGGED MINI SPLIT	SERVES NEW DCS ROOM
HEAT PUMP 2	SERVES PREPERATION ROOM

ROOM SCHEDULE

ROOM NO.	ROOM NAME	AHU	CM	RH	RF	EF	FEF	FH	CH
100	FIELD SERVICES	19	20	-	-	4	-	-	-
100a	MEN'S LOCKER/RESTROOM	19	19	-	-	4	-	-	-
100b	WOMEN'S LOCKER/RESTROOM	19	19	-	-	4	-	-	-
101	D.I.	19	18	-	-	4	-	-	-
102	SHIPPING/RECEIVING AREA	19	18	-	-	4	-	-	-
103	SAMPLE NIGHT DROP	18	31	-	-	5	-	-	-
104	STORE ROOM	18	28	-	6	-	-	-	-
105	SAMPLE RECEIVING	18	29	-	6	-	8	14	-
105A	INORG SUPERVISOR	18	30	-	6	-	-	-	-
105B	MICRO ASSISTANT	18	24	-	6	-	-	-	-
106	COLD ROOM	-	-	-	-	-	-	-	-
107	LAB MANAGER	18	27	-	6	-	-	-	-
108	INORG. ASST SUPERVISOR	18	25	-	6	-	-	-	-
109	ELECTRICAL ROOM	18	26	-	-	-	-	-	-
110	INORG. ASST SUPERVISOR	18	25	-	6	-	-	-	-
111	INSTRUMENT REPAIR SHOP	18	23	-	6	-	-	-	-
112	SHARED OFFICE	18	22	-	6	-	-	-	-
200	GAS CYLINDER STORAGE ROOM	-	-	-	-	16	-	-	-
201	GENERAL CHEMISTRY	13	15	-	-	-	6	11	-
202	L.C./M.S. & G.C./M.S.	13	12	-	-	2	6	12	-
203	GLASS WASH	16	32	-	-	3	7	13	2
204	V.O.A.	15	17	-	-	2	5	10	-
205	OVEN ROOM	16	33	-	-	3	-	-	1
205A	BALANCE	16	34	-	-	3	-	-	-
206	ORGANIC OPEN OFFICE	13	11	-	-	2	-	-	-
207	ORGANIC RES. OFFICE	13	10	-	-	2	-	-	-
208	CSAMPLE CON. & CLEAN	13	13	-	-	-	3	3,4,5,6,7,8	-
208A	CLSA	13	9	-	-	-	2	2	-
208B	HAZARDOUS MATERIALS	14	16	-	-	-	1	1	-
209	SPECTROSCOPY	16	35	-	-	3	-	-	7
210	LIQUID INSTRUMENT	16	36	-	-	3	4	9	-
300	SUPERVISOR'S OFFICE	17	8	-	7	-	-	-	-
301	SUPERVISOR'S OFFICE	17	7	-	7	-	-	-	-
302	SUPERVISOR'S OFFICE	17	6	-	7	-	-	-	-
303	SUPERVISOR'S OFFICE	17	7	-	7	-	-	-	-
304	MEN'S RESTROOM	17	5	-	-	1	-	-	-
305	WOMEN'S RESTROOM	17	5	-	-	1	-	-	-
306	TOXICOLOGY	17	4	-	-	1	-	-	-
306A	AQUATIC TOXICOLOGY	17	2	-	7	-	-	-	-
307	SUPERVISOR'S OFFICE	17	3	-	7	-	-	-	-

ROOM SCHEDULE CONT.

ROOM NO.	ROOM NAME	AHU	CM	RH	RF	EF	FEF	FH	CH
308	MICROBIOLOGY SUPERVISOR'S OFFICE	17	2	-	7	-	-	-	-
309	MICROBIOLOGY OPEN OFFICE	17	1	-	7	-	-	-	-
310	MICROBIOLOGY	11	-	-	-	8	9	15	-
311	MEDIA KITCHEN	12	42	-	-	9	-	-	-
312	CLEAN ROOM	12	44	-	-	-	10	16	5
313	MICROSCOPY	12	43	-	-	10	11	17	-
314	E.M. (FLAVOR PROFILE)	HP 2	-	-	-	11	-	-	-
314A	E.M. (FLAVOR PROFILE)	HP 2	-	-	-	11	-	-	-
400	INORG. CHEM. LAB	2	-	-	-	6,7,25	15,16	23,24	3,4
400A	RADIOLOGICAL LAB	2	-	-	-	-	14	22	-
400B	INORG. OPEN OFFICE	4	-	-	2	-	-	-	-
400C	INSTRUMENT LAB	1	40	-	-	15	12	20	-
401	BIOASSAY (ANTE ROOM)	8	37	-	-	14	-	-	-
402	BIOASSAY (MAIN ROOM)	8	38	-	-	14	-	-	-
403	ICP ICP/MS	1	39	-	-	15	13,6	21	-
404	PREPARATION LAB	1	41	-	-	13,15	12	18,19	6
405	CLERICAL LAB	4	-	-	2	-	-	-	-
405A	STORAGE (CLERICAL)	4	-	-	2	-	-	-	-
405B	COPY (CLERICAL)	4	-	-	2	-	-	-	-
406	LIBRARY	4	-	-	2	-	-	-	-
407	ARCHIVES/STORAGE	3	-	1	1	-	-	-	-
408	COMPUTER ROOM	3	-	-	1	-	-	-	-
409	MAIL/FAX	9	-	-	8	-	-	-	-
410	ELECTRICAL ROOM	9	-	-	8	-	-	-	-
411	RECEPTION/WAITING	9	-	-	8	-	-	-	-
411A	STORAGE (AT RECEPTION/WAITING AREA)	9	-	-	-	-	-	-	-
412	LUNCH ROOM	3	-	2,4	1	-	-	-	-
413	CONFERENCE ROOM (COMMON)	3	-	3	1	-	-	-	-
500	CONFERENCE ROOM (EAST OFFICE WING)	7	-	-	5	-	-	-	-
501	OPEN OFFICE (EAST WING)	5	-	-	3	-	-	-	-
501A	FIELD SERVICES SUPERVISOR	5	-	-	3	-	-	-	-
501B	WWT. MANAGER	5	-	-	3	-	-	-	-
502	MEN'S RESTROOM	7	-	-	-	12	-	-	-
503	WOMEN'S RESTROOM	-	-	-	-	12	-	-	-
504	VAULT	-	-	-	-	-	-	-	-
505	JANITOR	-	-	-	-	12	-	-	-
506	LOUNGE	7	-	-	-	-	-	-	-
600	FIELD OFFICES	6,10	-	5,9	4	-	-	-	-
600A	CONFERENCE ROOM (SOUTH OFFICE WING)	6	-	10	9,4	-	-	-	-
600B	MCP SUPERVISOR	6	-	8	9,4	-	-	-	-
600C	SUPV CONSTRUCTION INSPECTION	10	-	7	9	-	-	-	-
600D	PE. WCP	10	-	6	9	-	-	-	-

EXHIBIT E
FIRE PROTECTION SYSTEMS EVALUATION FOR KEY AREAS OF SD-1

FOR

MAIN WASTEWATER TREATMENT PLANT HVAC AND BUILDING IMPROVEMENTS

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SYSTEMS OVERVIEW, FEATURES, GENERAL OBSERVATIONS AND RECOMMENDATIONS

Fire Protection Systems Evaluation For Key Areas of SD-1

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Table of Contents

Executive Summary

The purpose of this report is to present the results of a limited study of the existing fire protection provided for the East Bay Municipal Utility District (EBMUD) Special District-1 (SD-1) Administration Building Lab Computer Room, the Administration Building Penthouse Phone and Communication Room, and the Ops Center Control Room and Computer Room.

The study scope included the identification of the fire protection features observed within the individual spaces; a review of their effectiveness and compliance with relevant Building and Fire Code requirements; and recommendations for alternative methods of protection as necessary and appropriate.

Neither the SD-1 Administration Building nor the Ops Center Building are protected by automatic fire sprinkler systems. The Administration Building Lab Computer Room is currently protected by a Fenwal Halon 1301 total flooding fire suppression system, actuated by a manual releasing station, and signals from cross-zoned photo-electric and ionization smoke detectors. Similarly, both the Ops Center Control Room and Computer Room are also protected by separate, individual Fenwal Halon 1301 total flooding fire suppression systems, each actuated by manual releasing stations, and signals from cross-zoned photo-electric and ionization smoke detectors. Automatic fire suppression is not provided for the Administration Building Penthouse Phone and Communication Room. Automatic smoke detectors, signaling to the Building's fire alarm control unit/system provide protection for this space.

At the time of the construction of these Buildings, automatic fire sprinkler protection was not required by the Code of Record. Automatic fire sprinklers would provide an excellent level of fire protection for these spaces, and preaction fire sprinklers are currently used to protect of several similar purpose and critical areas at the District's Administration Building in Downtown Oakland.

Key findings and recommendations are listed below:

- The District should consider discontinuing the use of the existing Halon 1301 fire suppression systems provided for the Administration Building Lab Computer Room and the Ops Center Control Room and Computer Room for several reasons:
    - Halon is no longer manufactured for use in fire suppression systems;
    - Halon is more suitable for free flaming fires, not smoldering fires which is more likely to occur in the subject spaces based on the observed contents;
    - Halon is most effective for rooms that are relatively air tight (the observed spaces will likely need to be modified to become effectively air tight).

- Emergency power and HVAC shutdown are essential to prevent damage to computer servers, associated electrical equipment during fire events, to maintain the fire suppression agent in the protected space(s), and to prevent the spread of smoke and/or fire in a fire situation. An approved manual and automatic means for electrical power shutdown, and an automatic means of HVAC shutdown/isolation, should be provided for the protected spaces.

- The District should determine which spaces are considered critical to operations and provide protection for those spaces, only.

- The District should consider the installation of preaction fire sprinkler or Vortex® fire suppression systems, actuated by a fire alarm system using smoke detection, for spaces considered critical. This approach provides a higher level of fire protection for these spaces, continued compliance with the CBC and reduces the risk of water damage resulting from accidental suppression system discharge.

A. Introduction

This report presents the results of a limited study of the fire protection features provided for various spaces within the Administration Building and the Ops Center at the East Bay Municipal Utility District (EBMUD) Special District-1 (SD-1), located at 2020 Wake Avenue in Oakland, California. Specifically the Administration Building Lab Computer Room, the Administration Building Penthouse Phone and Communication Room, and the Ops Center Control Room and Computer Room.

HYT Corporation performed a brief site visit on May 22nd, 2014 for the purposes of making observations regarding the individual spaces, the operations and storage taking place within each of the subject spaces, and for collecting relevant information relating to the fire protection systems provided for the individual spaces. Aiding in the development of this limited study, HYT Corporation met with District staff who were familiar with these subject areas and utilized record drawings provided by EBMUD indicating several of the various fire protection features provided for these spaces.

The primary focus of the Study is the identification of the fire protection features observed within the individual spaces, their effectiveness, compliance with relevant Building and Fire Code requirements, and recommendations for protection as necessary and appropriate. In addition, observations which may not necessarily have Code compliance implications, but which may constitute "good engineering practice," were considered and recommendations made as appropriate.

As the study is limited to the items identified above, this report does not provide a complete listing of all possible Code requirements or recommended best practices.

B. Relevant Codes and Standards

This information provided in this report was developed using consensus codes and standards, such as those promulgated by the National Fire Protection Association (NFPA); and model Codes, such as the International Building Code (as amended and adopted by the state of California). Specifically, the following codes and standards were utilized in the assessment of the facilities:

- Title 24 of the California Code of Regulations, Part 2, 2013 California Building Code (CBC),
- Title 24 of the California Code of Regulations, Part 9, 2013 California Fire Code (CFC),
- NFPA 13 Standard for the Installation of Sprinkler Systems, as amended and adopted by the State of California CBC and CFC,
- NFPA 72 National Fire Alarm and Signaling Code, as amended and adopted by the State of California CBC and CFC,
- NFPA 750 Water Mist Fire Protection Systems, as amended and adopted by the State of California CBC and CFC,

- NFPA 2001 Clean Agent Systems, as amended and adopted by the State of California CBC and CFC,
- NFPA 25 Water- Based Fire Suppression Systems (California Edition),
- NFPA 75 Standard for the Protection of Information Technology Equipment, representing a standard of recommended and/or good practice (i.e. not adopted by the State of California.

C. General Components of a Fire Protection System

Fire protection systems are typically installed for protection of a building or a specific space for a variety of reasons, the primary of which is compliance to the adopted codes and standards applicable to the jurisdiction in which the protected premises is located. Other considerations for the installation of a fire protection system include mitigation of specific hazards (such as flammable liquids), limitation or reduction of property loss exposure, limitation or reduction of data loss exposure, and protection of sensitive equipment. Of course, the installation of a properly designed and installed fire protection system also enhances the life safety features for the occupants of the building or space.

A fire protection system can consist of a fire detection and/or fire alarm system, a fire suppression system, or a system comprised of a fire detection system for operation of a fire suppression system (such as the Halon 1301 fire suppression systems provided for protection of designated spaces at SD-1). Often, fire protection systems also interface with building systems, such as HVAC fan units, interruption of power sources, operation of dampers, operation of door closures, etc. These ancillary functions are typically present to prevent the fire suppressing agent from causing damage to sensitive equipment, to maintain a concentration of fire suppressing agent in a space, and to prevent the spread of smoke and/or fire in a fire situation.

A brief discussion of common and typical fire protection system components follows.

C1. Fire Detection and Alarm Systems

The design, installation, operation, maintenance, and testing of fire detection and alarm systems is governed by NFPA 72 National Fire Alarm and Signaling Code, as amended and adopted by the State of California CBC and CFC.

The two basic types of fire alarm systems are conventional systems and multiplexed/addressable systems. The difference between these two types of system is their intelligence. A conventional system does not use a microprocessor, so it does not provide alarm address specific information. The alarm initiating devices are “zoned” by circuit, limiting their ability to specifically identify the location of an alarm condition to the size of the zone circuit on which the device in alarm is located. As there is no programming involved, alarm functions (such as operating a Halon 1301 system) and ancillary functions (such as closing dampers) is typically accomplished using switch settings and relays.

A multiplexed/addressable fire alarm system uses a microprocessor, programmed to perform a variety of functions such as operation of fire suppression systems, control of building equipment, etc. Each of the alarm initiating devices is located on a signaling line circuit (SLC), rather than a “zone,” Regardless of the type of system considered, a fire alarm system generally consists of the following components or features:

a) Fire Alarm Control Unit

The fire alarm control unit is the heart and brain of the fire alarm system. It typically contains the power supply necessary for operation of the fire detection devices and the occupant notification appliances. Depending upon the type of system (conventional or addressable), the control receives alarm initiating signals from the various fire detection devices on the system, monitors fire suppression systems, and performs other ancillary functions as designated by the designer. The fire alarm control supervises itself and the circuits associated with the fire alarm system so that ground faults, open circuits, missing devices and appliances, loss of power, microprocessor faults, etc. are alarmed at the control unit. In most cases, the fire alarm control unit also signals alarm, trouble and supervisory signals to a remote monitoring location to cause for fire department response (on alarm conditions) or for maintenance or servicing (trouble and supervisory signals). Fire alarm control units are Listed/Approved for specific applications by Underwriters' Laboratories and are also listed by the California State Fire Marshal's Office in the CSFM Building Equipment Listing.

b) Alarm Initiating Devices

Alarm initiating devices are the eyes and ears of the fire alarm system. They typically consist of manual fire alarm pull stations, heat detectors, smoke detectors, fire sprinkler waterflow switches, and fire suppression system actuation indication (such as pressure switches). Alarm initiating devices may also include valve positions supervisory switches (such as those on fire sprinkler control valves) and ancillary equipment such as gas cabinet detectors, carbon monoxide detectors, etc. On a conventional system, the types of devices and their locations are typically provided on a zone basis (i.e. one circuit for manual fire alarm pull stations, one circuit for elevator smoke detectors, one circuit for valve supervisory switches, etc.) as different types of alarm conditions may necessitate different responses or actions. In an addressable system, the various types of alarm initiating devices may be located on the same SLC as the control unit maintains programming to cause for the different responses to different types of alarm signals. Alarm initiating devices are Listed/Approved for specific applications, and for specific fire alarm control units, by Underwriters' Laboratories and are also listed by the California State Fire Marshal's Office in the CSFM Building Equipment Listing.

c) Occupant Notification Appliances

Occupant notification appliances provide the warning mechanism of a possible fire condition. They are the mouth of the fire alarm system. Appliances typically consist of audible appliances, visual appliances, and/or combination audible/visual appliances. Audible alarms may consist of horns, speakers (for voice alarm systems-such as required for high-rise buildings), bells or chimes. Bells and chimes are typically only permitted in a limited number of Occupancies or circumstances. In California, audible alarms must consist of the temporal Code 3 pattern (as designated in the requirements of NFPA 72), repeated until the alarm signal is silenced at the control unit or until the alarm condition has cleared at the control unit and the control unit has been reset. In voice alarm systems, the temporal Code 3 pattern is repeated multiple times, followed by a prerecorded voice message. Audible fire alarm warning is required to be a minimum of 15dbA above the ambient sound conditions in the space. Audible alarm requirements for residential occupancies and sleeping areas (i.e. hotel rooms) are different, but not relevant to the conditions at SD-1. Visual alarms consist of strobes, located behind a clear

lens. NFPA 72 contains specific requirements for the placement of visual occupant notification appliances to provide coverage of the specific space. In general, strobes are required in public accessible areas. NFPA 72 also requires that strobes within spaces be synchronized to prevent epileptic seizures of photo sensitive individuals. Occupant notification appliances are Listed/Approved for specific applications, and for specific fire alarm control units, by Underwriters' Laboratories and are also listed by the California State Fire Marshal's Office in the CSFM Building Equipment Listing.

C2. Fire Suppression Systems

The design, installation, operation, maintenance, and testing of fire suppression systems is governed by several different NFPA Standards, depending upon the type of fire suppression system installed. The typical standards applied include NFPA 13 Standard for the Installation of Sprinkler Systems, NFPA 750 Water Mist Fire Protection Systems, NFPA 2001 Clean Agent Systems, and NFPA 25 Water- Based Fire Suppression Systems. In many cases, the State of California has amended various requirements within each of these Standards and adopted them with the State amendments in the CBC and CFC. Additionally, the State of California enforces the requirements of Title 19 for the maintenance and servicing of fire suppression systems (specifically fire sprinkler systems). Title 19 is basically an amended version of NFPA 25 Water- Based Fire Suppression Systems.

While there are a variety of types of fire suppression systems and agents available (i.e. firefighting foams, carbon dioxide, water-spray deluge, etc.), the three primary types of fire suppression systems commonly found are fire sprinkler systems, gaseous fire suppression systems, and water mist fire suppression systems. A fourth type of suppression system, Vortex, is relatively new and utilizes a combination of gaseous agent and water mist. The difference between these various types of system is the agent used to suppress or control a fire. A basic description of these types of fire suppression systems follows:

a) Fire Sprinkler Systems

Fire sprinkler systems are the most common type of fire suppression systems. There are a variety of types of fire sprinkler systems, but their basic components are the same and include an adequate water supply/source, a service connection, backflow prevention (which various from jurisdiction to jurisdiction), control valve(s), fire sprinkler piping, and fire sprinklers. Fire sprinklers are Listed/Approved by various agencies for specific types of installations, areas of coverage, discharge densities, pressure ratings, temperature ratings, response time index, etc.

A wet-pipe fire sprinkler system is the most common type of fire sprinkler system. The fire sprinkler piping is filled by water and remains static until flow is initiated by operation of a fire sprinkler, as a result of sufficient heat at the sprinkler to cause for its operation. The only real alarm initiating interfaces between a fire alarm system and a wet-pipe fire sprinkler system are waterflow switches to signal flow conditions and valve position supervisory switches to signal valve closures.

Preaction fire sprinkler systems contain the same basic components as a wet-pipe fire sprinkler system, but additional equipment and fire alarm system interfaces are necessary. In a preaction fire sprinkler system, the fire sprinkler piping is filled with air, rather than water. Air is used to supervise the integrity of the fire sprinkler piping. As a result, an appropriate air supply must be provided for all preaction fire sprinkler systems, which also results in additional fire alarm system

interfaces to monitor the air pressure on the piping network. Water fills the fire sprinkler piping only when specific conditions are satisfied. Preaction fire sprinkler systems are typically used in spaces where there is a concern for have a source of water continuously present, overhead.

The two most common types of preaction fire sprinkler systems are the single-interlock preaction fire sprinkler system and the double-interlock preaction fire sprinkler system. In a single-interlock system, water fills the fire sprinkler piping only when there is insufficient air pressure in the fire sprinkler piping to maintain the valve closed. Loss of this volume of air is assumed to be as a result of the operation of one or more of the fire sprinklers on the system (i.e. the air escapes the piping network via the orifice of the fire sprinkler). Water is then discharged from the operated fire sprinkler(s). Only one criterion needs to be satisfied for system operation, loss of air in the piping network (assumed to be as a result of the operation of one or more of the fire sprinklers).

In a double-interlock system, two conditions have to be satisfied before water fills the fire sprinkler piping. One of these conditions is the loss of air pressure in the piping network (similar to the single-interlock system). The second condition that must be satisfied to cause for water to enter the piping network is a signal from a fire alarm control unit (Listed/Approved for releasing service). This signal is typically provided by smoke detection in the space protected by the double-interlock fire sprinkler system. Upon detection of smoke (assumed to be prior to sufficient heat at the fire sprinkler to cause for its operation to release air pressure in the piping network) and the loss of air pressure, the preaction fire sprinkler valve is opened to cause for water to fill the piping network and discharge from operated fire sprinklers. Both criteria must be satisfied for system operation. A double-interlock system therefore, requires additional fire alarm interfaces for the smoke detection and releasing of the system valve. The District currently protects critical assets in the District's Administration Building in Downtown Oakland using double interlock preaction fire sprinklers.

b) Clean Agent Fire Suppression Systems

Clean agent fire suppression system use a firefighting agent (gas) that chemically interacts with the combustion process to suppress or control a fire. The Halon 1301 fire suppression system protecting spaces at SD-1 are clean agent systems. There are a variety of clean agent currently Listed/Approved for total flooding fire suppression systems. Clean agent systems are designed to fill a volume (the protected space) to a pre-determined concentration (which varies from agent to agent) and to maintain that concentration for a designated period of time (typically 10-minutes). This application is called "total flooding" as the agent is intended to completely fill the volume of the protected space. Maintaining the concentration for a specified period of time is called "holding time." Clean agent systems require a fire detection system to detect the products of combustion and a fire alarm control unit/releasing unit to monitor/supervise the system and to control the system. Upon the appropriate smoke detection signal from the detector(s), the control unit causes for operation of the clean agent system, typically through the use of a control head on the agent container.

The basic components of a clean agent system are the agent container (typically an ASME vessel as the agent is stored under pressure), a control head to initiate operation upon fire alarm signals, agent distribution piping, and discharge nozzles.

c) Water Mist Fire Suppression Systems

Water mist fire suppression systems typically use a water storage vessel (or a pump), gas/air (or a pressure vessel), and water. Very fine water droplets represent the agent in this type of system. Gas, or a pump, is used to pressurize the water at a discharge nozzle to cause for discharge of microscopic sized water droplets. The design of the discharge nozzle represents one of the key factors for system performance. The design intent is to provide such a fine mist that it is capable of controlling or suppressing the fire without resulting in a large volume of water. Water mist systems are typically approved for use in enclosed spaces as their design is dependent upon the volume of the space being protected. There are a variety of water mist systems (and a variety of design concepts for these types of systems) currently Listed/Approved for fire suppression systems. The Listings/Approvals for these types of system is usually very specific in regard to the hazard and size/volume. Water mist systems are designed to fill a volume (the protected space) and to maintain that concentration for a designated period of time.

Water mist systems require a fire detection system to detect the products of combustion and a fire alarm control unit/releasing unit to monitor/supervise the system and to control the system. Upon the appropriate smoke detection signal from the detector(s), the control unit causes for operation of the water mist system.

d) Vortex Fire Suppression Systems

A Vortex suppression system is a combination of a clean agent fire suppression system and a water mist fire suppression system. The Vortex system utilizes nitrogen and water mist to suppress and control fires within a confined space. The primary operation and components are similar to those described above for both the water mist and clean agent systems. The system consists of a smoke detection system, electrically actuated valves, dry nitrogen piping, dry water piping, and water mist nozzles. Under normal conditions, the fire protection piping is dry (empty of water and nitrogen). The basic system operation uses a smoke detection system to detect products of combustion. Upon smoke alarm, a fire alarm control unit causes for a signal to be sent to the Vortex valves causing them to open and for a very small quantity of water to fill the system piping. Water is mixed with nitrogen at the nozzle to create a nitrogen and fine water mist for fire suppression and control. Unlike the clean agent fire suppression system, Vortex systems do not require a “tight” enclosure.

C3. Related Building Systems

Fire alarm and fire suppression systems typically are required to interact with a variety of building systems, such as HVAC fan units, HVAC dampers, and door closures. In computer space, data centers, or other electronically sensitive areas protected by fire sprinklers, fire alarm signals are typically transmitted to cause for the cessation of power, to prevent damage to equipment caused by water intrusion on energized equipment. Also, in the instances involving computer equipment, the energized electrical source is commonly the source of the fire. Cutting power often results in stopping the fire. These signals are usually generated by smoke detection and/or waterflow switches. When spaces are protected by fire

suppression systems requiring tight enclosures (i.e. clean agent fire suppression systems), means must be provided to ensure that air changes do not take place to cause for the dilution of the agent to a concentration below the design concentration. This results in the required closure of doors and HVAC openings (or the shutdown of the appropriate HVAC unit). Similarly, doors and other openings must be closed (and appropriately sealed) to prevent loss of the agent. These functions are most usually performed by a fire alarm system.

D. Facilities Evaluated, Existing Fire Protection, and Findings

D1. Administration Building Lab Computer Room

The Administration Building Lab Computer room currently is protected by a Halon 1301 fire suppression system and occupies an area of approximately 120 ft2. The spaces house computer servers, shelving, and storage. (See partial plan below).

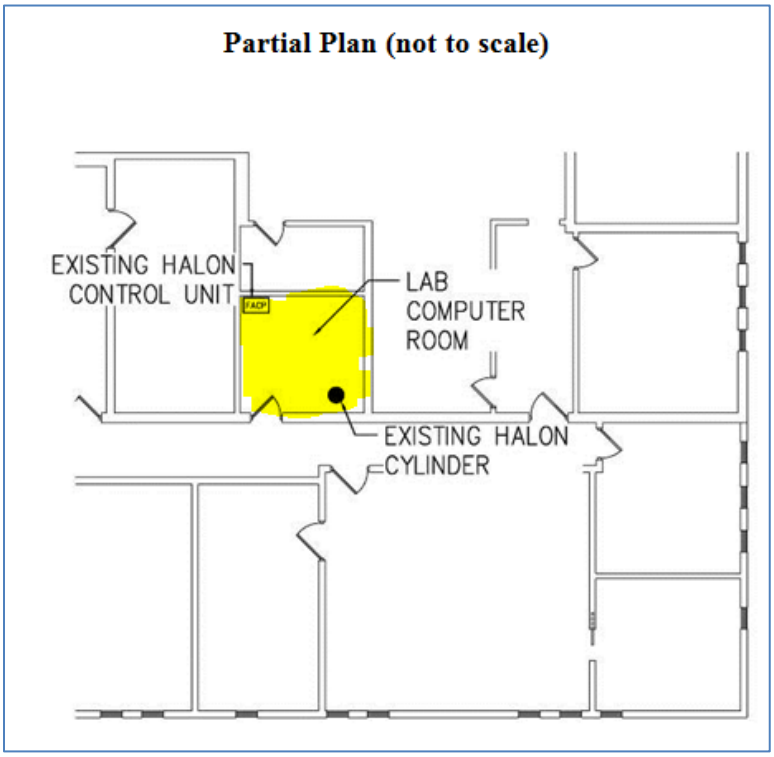

Figure 1. SD1 Administration Building Lab Computer Room

Automatic fire sprinkler protection is not provided for the Building, or for the Administration Building Lab Computer Room. At the time of construction, automatic fire sprinklers were not required.

An automatic, engineered Halon 1301 fire suppression system is provided for the Administration Lab Computer Room. The system was manufactured by Fenwal and consists of a single Halon 1301 storage cylinder (located above the dropped ceiling), control head, system distribution piping and nozzle. The controls for, and actuation of, the system are provided by a Fenwal control unit.

The Fenwal fire alarm control unit (FACU) is provided for the Halon system protecting the space. This FACU serves the Halon system for the space, only, and receives alarm-initiating signals from the following devices:

- Halon manual releasing pull station
- Halon abort station ("dead-man" type)
- Spot-type smoke detectors (a single photoelectric smoke detector and single ionization smoke detector, cross zoned)

Figure 2. Fenwal Control Unit

Figure 3. Detector and Notification Equipment

Figure 4. Halon Cylinder

Figure 5. Halon Manual Release and Abort

The Halon FACU is designed to signal trouble and alarm conditions to the Building's Notifier 4800 FACU, as required by NFPA 72, National Fire Alarm and Signaling Code.

The Fenwal FACU is Listed/Approved for releasing the Fenwal Halon 1301 fire suppression system. Spot-type smoke detectors are provided for protection of the space. The spot-type smoke detectors are cross zoned (i.e. two zones of detection are provided for the space), with reportedly one zone consists of a photoelectric detector and one zone consists of an ionization detector. Both of these zones signal to the

Fenwal FACU. An alarm from a single smoke detection zone or detector causes for a local alarm, signals to the Building's Notifier FACU, and lights the appropriate annunciator at the Fenwal FACU. A cross-zoned signal (i.e. a smoke alarm signal from both detection zones or detectors) causes for a local alarm, signals to the Building's Notifier FACU, lights the appropriate annunciator at the Fenwal FACU, and initiates a 30 second time delay for Halon discharge. If the system abort switch is not operated, the Halon discharges at the termination of the 30 second time delay. The Fenwal FACU initiates immediate (within 5 seconds) Halon discharge upon operation of the Halon system manual releasing pull station. HVAC fan controls or damper controls were not observed.

A variety of occupant alarm notification appliances are provided for the Halon fire suppression system, which signal the pre-discharge and discharge alarms, are supervised by the Fenwal FACU, and are powered from the Fenwal FACU. Warning signs are also posted.

At the time of the site visit, the system appeared to be functioning properly and all devices and appliances appeared to be suitably maintained.

A single Halon cylinder provides the agent for the system protecting this space and is located above the dropped ceiling, within the space protected.

The housekeeping practices observed are not considered appropriate or adequate. The space contains miscellaneous combustible materials including printing/copying supplies, paper, un-used office equipment, etc. The amount of combustible materials observed present an unnecessary fire hazard and is not being maintained in accordance with relevant Standards.

Figure 6. Storage in Computer Room

Figure 7. Storage in Computer Room

Figure 8. Sub-floor Debris and Cabling

The power supply arrangement for the room is confusing and does not appear to be consistent with general good engineering practices for essential facilities. The space originally had a clean power supply unit (located in the Penthouse) to provide the electrical supply and distribution to the computer equipment. This supply was provided with an Emergency Power Off (EPO) switch, which could be used in the event of an emergency. This power supply no longer powers the electrical distribution in the room.

Additional power supply and distribution to the room was also provided with circuits powered by the Building's emergency generator (provided with red outlets in the room). These circuits have since been removed from the electrical distribution for the room.

Figure 9. Emergency Generator Power Circuit (Red outlets)

A third power supply originally provided consisted of an Uninterruptable Power Supply (UPS) system with the power supplies located in the Penthouse. These circuits do not have EPO capability. Lastly, the room is provided with electrical power and distribution from the Building's normal power distribution. Once again, these circuits do not have EPO capability.

Figure 10. Emergency Power Off/Disconnect

Observations made at the time of the site visit indicated that energized electrical equipment sensitive to water intrusion (and assumed to be essential to the District's operations) are present. Manual electrical power disconnect switches were observed, but are no longer functional. In addition to the loss of operations concerns caused by potential power outages (i.e. the existing electrical arrangement provided for the room), emergency power shutdown is essential to prevent damage to the servers and associated electrical equipment during fire events, or given a failure of other building systems resulting in potential water exposure to the energized equipment.

The HVAC arrangement for the room does not provide automatic shutdown or damper closure for the containment of the Halon 1301 agent following discharge. The HVAC system has been modified to provide ventilation via the Building's HVAC system, in addition to its own self-contained HVAC supply, and no automatic shutdown or dampers are provided. The door providing access to the space does not appear to be air tight and penetrations in the walls and ceilings do not appear to be sealed to be air tight. It is necessary to maintain the Halon concentration for a 10 minute time period following discharge for effective suppression. Discontinuing the HVAC supply to a protected space, ensuring all openings and penetrations are sealed is necessary to maintain the Halon concentration for effective suppression.

D2. AB Penthouse Phone and Communication Room

The Administration Building Penthouse Phone and Communication Room currently has no automatic fire suppression protection. The space occupies an area of approximately 280 ft2 and houses communications equipment. (See partial plan below).

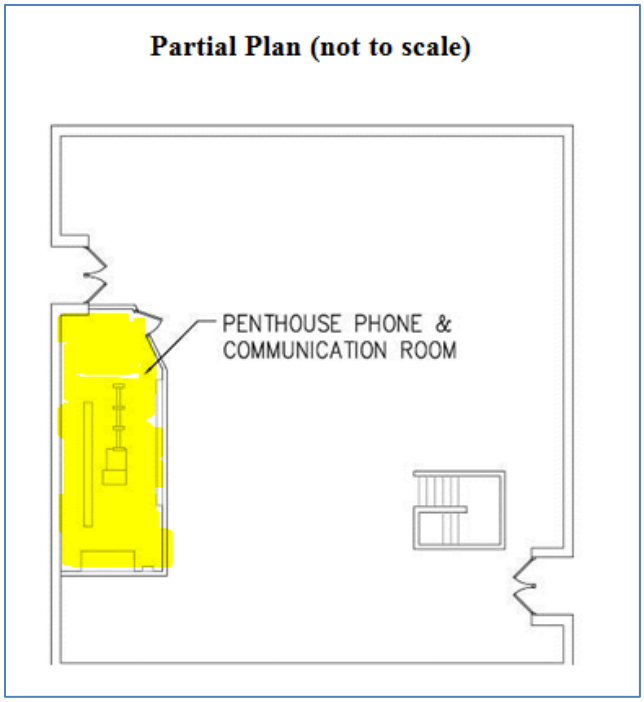

Figure 11. SD1 Admin Penthouse Phone and Communication Room

The Administration Building Penthouse Phone and Communication Room currently has no automatic fire

suppression protection. The space occupies an area of approximately 280 ft2 and houses communications equipment.

Automatic fire sprinkler protection is not provided for the Building, or for the Administration Building Penthouse Phone and Communication Room. At the time of construction, automatic fire sprinklers were not required.

Automatic smoke detection is provided for the space. The smoke detectors communicate alarm and trouble conditions to the Building's Notifier 4800 FACU.

The housekeeping practices observed are not considered adequate or appropriate. The spaces contain miscellaneous combustible materials including printing/copying supplies, paper, un-used office equipment, etc. The amount of combustible materials observed present an unnecessary fire hazard and is not being maintained in accordance with relevant Standards.

Figure 12. Miscellaneous Debris and Storage

D3. Ops Center Control Room and Computer Room

The Ops Center Control Room and Computer Room are currently protected by a Halon 1301 fire suppression systems and occupy areas of approximately 715 ft2 and 150 ft2, respectively. The Control Room houses computer work stations and desk space for the Plant Operations. The Computer Room houses servers and desks. Halon protection is provided for each of the rooms (a separate Halon system is provided for each space). (See partial plan below).

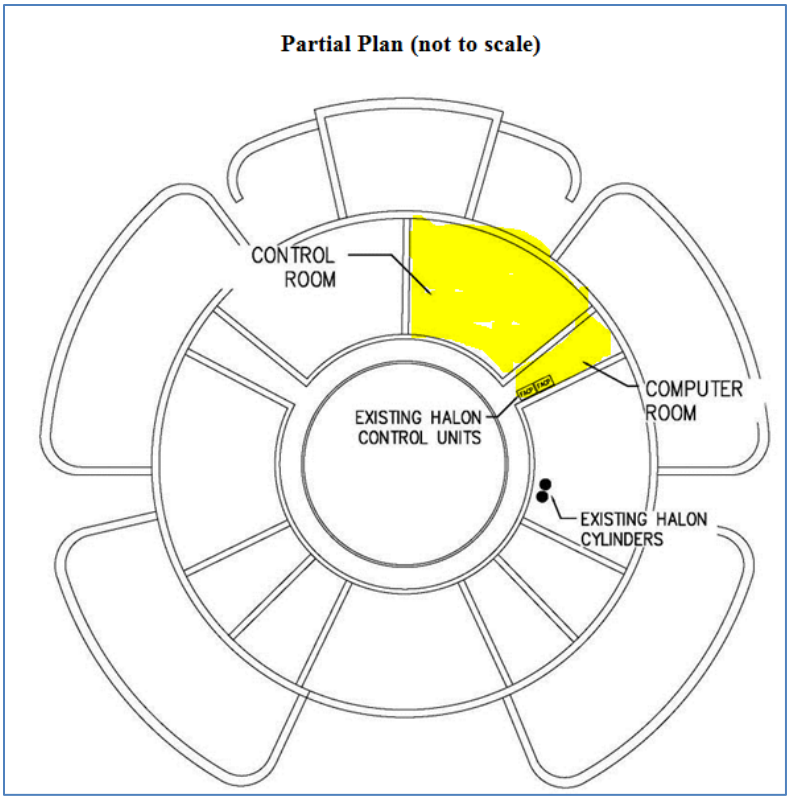

Figure 13. Operations (Ops) Center Control and Communication Room

The Ops Center Control Room and Computer Room are currently protected by a Halon 1301 fire suppression systems and occupy areas of approximately 715 ft2 and 150 ft2, respectively. The Control Room houses computer work stations and desk space for the Plant Operations. The Computer Room houses servers and desks. Halon protection is provided for each of the rooms (a separate Halon system is provided for each space). (See partial plan below).

Automatic fire sprinkler protections not provided for the Building, or for the Ops Center Control Room and Computer Room. At the time of construction, automatic fire sprinklers were not required.

An automatic, engineered Halon 1301 fire suppression system is provided for the Ops Center Control Room, and the Computer Room (separate systems for each space). Each of the systems were manufactured by Fenwal and each system consists of a single Halon 1301 storage cylinder (located in a mechanical room adjacent to the Computer Room), control head, system distribution piping and nozzle. The controls for, and actuation of, each of the systems is provided by a Fenwal control unit (one control unit for each space).

The Fenwal fire alarm control units (FACU) are provided for the Halon system protecting each space. Each FACU serves the Halon system for the space only, and receives alarm-initiating signals from the following devices:

- Halon manual releasing pull station
- Halon abort station (“dead-man” type)

- Spot-type smoke detectors (photoelectric smoke detectors and ionization smoke detectors, cross zoned).

Figure 14. Smoke Detection

Figure 15. Emergency Power Off (typical for both Ops Control and Computer Rooms)

Each of the Fenwal FACU are Listed/Approved for releasing the Fenwal Halon 1301 fire suppression systems. Spot-type smoke detectors are provided for protection of the room. The spot-type smoke detectors are cross zoned (i.e. two zones of detection are provided for the room), with one zone of photoelectric detectors and one zone of ionization detectors. These zones signal to the Fenwal FACU. An alarm from a single smoke detection zone causes for a local alarm and lights the appropriate annunciator at the Fenwal FACU. A cross-zoned signal (i.e. a smoke alarm signal from both detection zones) causes for a local alarm, lights the appropriate annunciator at the Fenwal FACU, and initiates a 30 second time delay for Halon discharge. If the system abort switch is not operated, the Halon discharges at the termination of the 30 second time delay. The Fenwal FACU initiates immediate (within 5 seconds) Halon discharge upon operation of the Halon system manual releasing pull station. HVAC fan controls or damper controls were not observed.

Figure 16. Fenwal Control Units for both Ops Control and Computer Rooms (located in Computer Room)

A variety of occupant alarm notification appliances are provided for the Halon fire suppression system, which signal the pre-discharge and discharge alarms, are supervised by each of the Fenwal FACU, and are powered from each of the Fenwal FACU. Warning signs are also posted.

Figure 17. Notification Appliances

At the time of the site visit, the systems appeared to be functioning properly and all devices and appliances appeared to be suitably maintained (by Global Fire & Safety of Oakland, California).

Two Halon cylinders (a single Halon cylinder for each space) are located in the Mechanical Room adjacent to the Computer Room and provide the agent for each of their respective systems.

Figure 18. Separate Halon Cylinders for Ops Control and Computer Rooms

Figure 19. Halon Manual Release and Abort
(typical for both Ops Control and Computer Rooms)

It was not determined if automatic power shutdown capabilities are provided for the Ops Center Control Room and Computer Room (manual EPO switches were observed for both spaces and were reported to be

operational). The air tight capabilities of the spaces were not verified. The ventilation system should be confirmed to cause for shutdown during Halon discharge. Penetrations and door openings should also be confirmed to be adequately sealed.

E. Fire Protection Systems for Consideration at SD1

The fire protection systems considered for installation to protect the subject spaces at SD1 are discussed in the following paragraphs. Additionally, typical design and estimated construction costs are included in the tables of this section. As with any engineering budget estimate, these estimates reflect a probable construction and installation costs using commercially available resources and list pricing from various manufacturers. This estimate may be used for budgeting purposes, but it may not reflect actual cost figures for the work as contracting conditions, the presence of asbestos or other hazardous materials, or other hidden conditions have not been considered.

In preparing this estimate of probable construction costs, the following resources were considered:

- Means Construction Cost Data
- Marshal & Swift Construction Cost Data
- Fire alarm equipment manufacturer's published price lists
- Bidding cost data from fire alarm system distributors

The Project Drawings were utilized in developing the estimate of probable costs for the installations. Judgment was applied in regard to possible Contractor routing, conduit routing, extent of work to provide raceways in concealed areas, etc.

E1. Fire Detection and Alarm

The existing fire detection provided for the spaces under consideration in this evaluation consist of standard response photoelectric and ionization smoke detectors. Photoelectric principle smoked detectors utilize a photoelectric light source aimed at a light sensitive receiver inside a collection chamber in the detector. Particles of combustion (i.e. smoke) enter the chamber and interrupt the light to cause for the detector to go into alarm. Ionization detectors utilize a small (and safe) radioactive source inside the collection chamber of the detector. Particles of combustion (i.e. smoke) enter the chamber and the radioactive source "ionizes" them to cause for a small current flow to cause for the detector to go into alarm. These detectors are typical to what would normally be found in business, assembly, light manufacturing, and similar occupancies. Typically, the manufacturer of smoke detector used in these types of installations must be Listed/Approved for use with the fire alarm control unit to which it is connected to, powered by, and communicating with. While suitable for most applications, more sensitive detection is sometimes warranted for protection of high value installations, or installations where business or operations interruption is a concern.

In locations where greater smoke detection sensitivity is desired or warranted, high sensitivity air sampling smoke detection (HSSD) systems are typically used. The most prevalent manufactures and types of systems are Fenwal's Analaser and Xxtralis's VESDA. These systems utilize a sample pipe network (which can be of almost any material such as copper, CPVC, steel, conduit, etc.) within the protected space. The sample piping (which is typically no larger than 1-inch in diameter) contains drilled sample ports, spaced at intervals in accordance with NFPA 72 for smoke detector spacing. The sample

piping is routed back to the detector. A small fan in the detector draws air from the protected space(s) via the sample ports and sample piping, back to a very sensitive detector and detection chamber. The detector can be programmed for a variety of sensitivities (subject to the detector's Listings and Approvals). These detectors are capable of detecting very small fires in their very early stages, and can be programmed for a variety of actions, based upon responses to predetermined alarm ranges. Most of these detectors have three or more pre-set alarm ranges which can provide different actions based upon different levels of alarm. An early Alarm warning can be used to cause for investigations, while the highest level of alarm can be used to actuate fire suppression systems. HSSD systems are typically programmed to provide HVAC shut down, emergency power shut down, and similar functions prior to the action of operating a fire suppression system. Unlike the typical smoke detectors described above, HSSD detectors can interface with almost any fire alarm control unit as the detector is provided with relay contacts for alarm, trouble, and supervisory, outputs.

The existing fire alarm control unit arrangement for the protected spaces under consideration in this evaluation are Listed/Approved for releasing fire suppression systems (i.e. Halon 1301 fire suppression systems) and use conventional alarm technology. Additionally, they communicate alarm and trouble conditions to the Building's fire alarm control unit. The existing units are older generation, but may still have some useful life span. Newer control units that may be considered for the spaces would likely be multiplexed, addressable technology, and could perform similar functions as the existing control units (i.e. fire detection, control of suppression systems, alarm signaling and communications with the existing Building fire alarm control unit).

Table 1. Typical Design and Costs for Fire Detection and Alarm Components

System Component	Typical Installation	Estimated Cost	Comments
Spot Type Smoke Detector, Control Module, Monitor Module	Conduit to each device, back box, cabling, etc.	$700/Ea.	Does not include conduit. May be possible to reuse (E) conduit.
HSSD Detector	1" CPVC piping from detector to each hazard.	$3,000/Ea.	Does not include CPVC Piping
CPVC Piping	1" in size	$2.50/Ft.	
CPVC Pipe installation	Above ceiling with capillary drops	$6.00/Ft.	Labor Only
Releasing Fire Alarm Control Unit	Battery back-up, 2-zones minimum releasing capability, multiplexed, addressable.	$3,000/Ea.	
Manual Releases, Abort Switches, Notification Appliances	Conduit to each device, back box, cabling, etc.	$400/Ea.	Does not include conduit. May be possible to reuse (E) conduit.
Door Holder	Conduit to each device, back box, cabling, etc.	$375/Ea.	Does not include conduit. May be possible to reuse (E) conduit.

E2. Fire Suppression Systems

The most common form of fire suppression that could be considered as a replacement for the Halon agent being used in the subject space would normally be fire sprinkler protection, specifically, a preaction fire sprinkler system. Fire sprinkler systems are typically supplied from dedicated service, not from taps into domestic water lines serving the building. As a result, new fire service water connections would be required. Preaction fire sprinklers, in addition to an HSSD system, are currently used at the District's Administrative Building in Downtown Oakland to protect the main "fish bowl" Control, Server/Computer, Records Storage, and Communication rooms.

Table 2. Typical Design and Costs for Sprinkler Suppression Components

System Component	Typical Installation	Estimated Cost	Comments
Building Fire Sprinkler Service Connection	4- to 6-inch service connection	Unknown	Service connection fees subject to local water jurisdiction.
Valve Assembly	Preaction valve for each hazard.	$8,500/Each	Pre-trimmed valve assembly. Provide a single valve for the two Ops Rooms.
Sprinkler Piping	Varying in size from 4" to 1"	$2.30/Ft. – $9.65/Ft/	
Sprinkler Pipe Installation	Above ceiling with drops	$9.00/Ft.	Labor Only

If the District elects not to provide preaction fire sprinkler protection for these critical spaces, a replacement extinguishing agent would need to be considered. The two systems worth consideration are a replacement gaseous fire suppression system and a hybrid gaseous/water mist fire suppression system.

Replacement gaseous fire suppression agents are commercially available. Some of these agents include FM-200® (manufactured by Great Lakes Chemical), FE-13™ (manufactured by DuPont Chemical), and PFC410 (manufactured by 3M Company). For the purposes of this study, and the areas protected by the gaseous systems, carbon dioxide has not been considered due to the life safety concerns the discharge of the agent would present.

Replacement gaseous system installations typically cannot utilize the existing Halon agent containers or nozzles. The system piping also typically has to be reconfigured or replaced. The storage cylinders for these agents also typically occupy a larger foot print (i.e. take up more space). In order for a gaseous fire suppression system to be effective, the enclosure or space into which the agent is discharged must be relatively air tight (i.e. not permit the agent to escape the enclosure or space. The agent must also have a sufficient time (or "holding time") to effectively suppress or extinguish the fire. This holding time is typically 10 minutes.

Gaseous systems may also present moderate hazards to occupants of the space or enclosure into which they are discharged. Gaseous systems typically require or recommend that the spaces be evacuated prior to discharge (similar to the Halon system). This is in part due to undesirable exposure to the gas and the products of decomposition but also the possible physical hazard presented by the high pressure discharge of the gas itself (very sudden and loud noise, reduced visibility, airborne debris, etc.). Lastly, upon discharge of the agent, a new quantity of agent must be purchased and the agent container(s) refilled by factory trained technicians. The cost of these agents is relatively expensive.

A hybrid gaseous/water mist fire suppression system (Vortex suppression system) utilizes nitrogen and water mist to suppress and control fires within a confined space. The system consists of electrically actuated valves, dry nitrogen piping, dry water piping, and water mist nozzles. Under normal conditions, the fire protection piping is dry (empty of water and nitrogen). The basic system operation uses a smoke detection system to detect products of combustion. Upon smoke alarm, a fire alarm control unit causes for a signal to be sent to the Vortex valves causing them to open and for a very small quantity of water to fill the system piping. Water is mixed with nitrogen at the nozzle to create a nitrogen and fine water mist for fire suppression and control. Vortex systems do not require a "tight" enclosure, permitting most existing construction features to remain unchanged. The water supply (a small quantity of water) is typically accomplished with a small, refillable tank and the nitrogen is supplied in standard commercially available nitrogen cylinders. These systems can also be arranged so that one system can provide protection of multiple spaces (i.e. one system, with separate piping, could be provided for protection of both spaces in the Ops Center Building. Refilling the system requires the recharge of water into the storage tank and replacement/refill of the nitrogen cylinders.

Table 3. Typical Design and Costs for Gaseous Suppression System Components

System Component	Typical Installation	Estimated Cost	Comments
Gaseous Suppression Agent	ASME Cylinders	$7,250 (Ops Control Room) $1,300 (Admin. Lab)	Does not include agent containers, valves, actuators, etc.
Gaseous Suppression Containers, valves, actuators, etc.	Rack and frame in a dedicated location	$8,750 (Ops Control Room) $3,200 (Admin. Lab)	Does not include system piping & nozzles (existing piping likely cannot be used).
Gaseous Suppression Piping	Varying in size from 3" to 1"	$2.30/Ft. – $9.65/Ft/	
Gaseous Suppression Pipe installation	Above ceiling with drops	$9.00/Ft.	Labor Only

Table 4. Typical Design and Costs for Vortex Suppression System Components

System Component	Typical Installation	Estimated Cost	Comments
Vortex Suppression System	Water tank, zone control panel, nitrogen cylinders	$46,550 (Ops Control Room) $23,200 (Admin. Lab)	Does not include system piping & nozzles (existing piping likely cannot be used).
Vortex Suppression System Piping	Varying in size from 4" to 1"	$2.30/Ft. – $13.80/Ft/	
Vortex Suppression System Pipe installation	Above ceiling with drops	$9.00/Ft.	Labor Only

F. Discussion & Recommendations

F1. General Discussion (1): Housekeeping

EBMUD has conveyed that the operations taking place in the spaces considered for this assessment are essential to District operations. This indicated level of the facility's operational importance necessitates that the appropriate measures be taken in regard to housekeeping practices, such as the control of combustible and miscellaneous materials in the spaces, as well as general debris accumulations.

The housekeeping practices observed in some of these identified essential spaces are not considered adequate or appropriate. In many instances, the spaces contain miscellaneous combustible materials including printing/copying supplies, paper, un-used office equipment, etc. The amount of combustible materials observed to be present in the Lab Computer Room and the Phone and Communication Room present an unnecessary fire hazard and are not being maintained in accordance with relevant Standards.

GENERAL RECOMMENDATION 1:

NFPA 75, Section 6.2.1 limits the amount of records within the Room to the absolute minimum required for essential and efficient operation. The facility should develop and follow a policy of ensuring that the quantity of combustible (and other non-associated) materials located within the space be limited to only those essential to the daily operations of the operations.

F2. General Discussion (2): Personnel Training

Suppression of fires in their very early, incipient, stages in the areas protected by Halon 1301 is the most effective method to prevent damage to sensitive and essential equipment. An effective method for early suppression of witnessed fires is through the use of an emergency power shutdown (EPO) and the use of portable fire extinguishers.

GENERAL RECOMMENDATION 2:

The District may wish to consider training personnel who normally work in the areas protected by Halon 1301 fire suppression systems in the use of the EPO and in the proper use portable fire extinguishers.

F3. General Discussion (3): Power Supplies

The power supply arrangement for the Administration Building Lab Computer Room is confusing and does not appear to be consistent with general good engineering practices for essential facilities. The space originally had a clean power supply unit (located in the Penthouse) to provide the electrical supply and distribution to the computer equipment. This supply was provided with an Emergency Power Off (EPO) switch, which could be used in the event of an emergency. This power supply no longer powers the electrical distribution in the room.

Additional power supply and distribution to the room was also provided with circuits powered by the Building's emergency generator (provided with red outlets in the room). These circuits have since been removed from the electrical distribution for the room.

A third power supply originally provided for the Lab Computer Room consisted of an Uninterruptable Power Supply (UPS) system with the power supplies located in the Penthouse. These circuits do not have EPO capability. Lastly, the room is provided with electrical power and distribution from the Building's normal power distribution. Once again, these circuits do not have EPO capability.

Observations made at the time of the site visit indicated that energized electrical equipment sensitive to water intrusion (and assumed to be essential to the District's operations) are present in the Administration Lab Computer Room. Manual electrical power disconnect switches were observed, but are no longer functional. In addition to the loss of operations concerns caused by potential power outages (i.e. the existing electrical arrangement provided for the room), emergency power shutdown is essential to prevent damage to the servers and associated electrical equipment during fire events, or given a failure of other building systems resulting in potential water exposure to the energized equipment. It was not determined if automatic power shutdown capabilities are provided for the Ops Center Control Room and Computer Room (manual EPO switches were observed for both spaces and were reported to be operational). Automatic and/or manual power shutdown capabilities are not provided for the Administration Building Penthouse Phone and Communication Room.

GENERAL RECOMMENDATION 3:

NFPA 75, Section 10.4.8 identifies requirements for power disconnect capabilities for these types of facilities. The District should investigate the existing arrangement to identify the features provided. An approved manual and automatic means should be provided to disconnect power to all electronic equipment in these spaces. The control for these disconnecting means should be grouped and identified and shall be readily accessible at the principal exit doors. Recommendations regarding potential automatic operation of these disconnects in concert with

the fire alarm system will be further and separately addressed later in this report.

F4. General Discussion (4): HVAC Control

The HVAC arrangement for the Administration Lab Computer Room is not arranged for automatic shutdown or dampers for the containment of the Halon 1301, other gaseous agents, or Vortex suppression systems agent following discharge. The HVAC system has been modified to provide ventilation via the Building's HVAC system, in addition to its own self-contained HVAC supply, and no automatic shutdown or dampers are provided. The HVAC arrangement for the Ops Center Control Room and Computer Room could not be verified. Discontinuing the HVAC supply to a protected space is necessary to maintain the Halon concentration for a 10 minute time period for effective suppression.

GENERAL RECOMMENDATION 4:

The District should investigate the existing arrangement to identify the features provided. An approved means to disconnect the dedicated HVAC systems serving these spaces and to cause all required fire/smoke dampers to close should be provided.

F5. General Discussion (5): Inadequate Enclosure(s)

The construction of the Administration Building Lab Computer Room does not appear to be adequate for containment of the Halon 1301, other gaseous agents, or Vortex suppression systems agent once discharged into the space. Gaps exist around the entry door to the room and it also appears that there are penetrations in the subfloor space which are not adequately sealed to prevent Halon from escaping. In order to be effective, the Halon concentration must be maintained within the room for a 10 minute period of time.

GENERAL RECOMMENDATION 5:

The configuration for the Ops Control and Computer Room should be confirmed to be air-tight. The existing arrangement should be modified as necessary and appropriate to provide a relatively air-tight enclosure.

F6. Discussion (6): Continued Use of Halon

Halon is no longer manufactured for use in fire suppression systems as it was identified as an ozone depleting material. While recycled quantities of Halon may still be available, they are usually reserved for critical industrial, explosive, or similar occupancies, and typically at a significantly elevated cost. The District does not have reserve capacity to refill/replace the existing Halon cylinders at these installations in the event it was to be discharged.

Halon 1301 suppresses fire by interrupting the chemical chain reaction taking place in the fire. It is best suitable for free flaming fires (i.e. those fires with visible flame, not a smoldering fire). The spaces protected by Halon 1301 appear to have ordinary combustibles, which typically exhibit characteristics more representative of a smoldering fire (i.e. "deep seated" fire) than a free flaming fire. This is

especially true during the incipient stages of a fire, when the Halon 1301 fire suppression systems are designed to actuate.

Fires in energized electrical equipment, representative of all of the protected spaces present a unique challenge. Water intrusion on energized electrical equipment can result in the loss of data or the equipment itself. Current, and recommended, industry practice is to de-energize this type of equipment early in a fire scenario. De-energizing the equipment may result in cessation of the fire itself, and may also reduce the risk of lost data and equipment due to water exposure on energized equipment.

In the event that the District continues to utilize the Halon fire suppression systems providing protection of these subject spaces, the District should consider the following recommendations:

RECOMMENDATIONS:

- The District should consider implementation of the measures identified in General Recommendations 1 through 5, above.

- The District should consider the implementation of the requirements and guidance within NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems to confirm that each of the spaces can achieve the minimum level of air tight encapsulation necessary to contain the agent for a sufficient time frame. The District should conduct room pressure testing for each space in accordance with the guidance within NFPA 2001 and develop the inspection and management of change controls identified within NFPA 2001. This would include an inspection once per year to confirm that modifications to the barriers (i.e. walls, ceilings, etc.) have not taken place to compromise the air tight features of the space.

- No additional modifications would be necessary for the existing Halon 1301 fire suppression systems, fire detection systems, or control systems.

F7. Discussion (7): Fire Protection Systems Modifications

Where fire service water is available on site, automatic fire sprinklers would provide an excellent level of fire protection for these spaces. As with all fire protection system modifications, general buildings retrofit installation may be costly and disruptive to the District's operations and personnel. Below are recommendations to the District for fire protection options to these spaces *outside of the Halon system*:

RECOMMENDATIONS:

- The District should consider implementation of the measures identified in General Recommendations 1 through 5, above for all of the spaces.

- The District should consider the installation of pre action fire sprinkler protection for the critical areas, actuated by a fire alarm system using smoke detection. This approach reduces the risk to water damage resulting from accidental discharge from the fire sprinkler protection. This protection should be considered primarily for the Administration Building Lab Computer Room (1 system) and for the Ops Center Control Room and Communications Room (1 system). Approximate installation costs for the preaction sprinklers are summarized

in Table 5 below.

- If preaction fire sprinkler protection is too costly *(typically because of service connection fees)*, or not desired, the District should consider the installation of a Vortex gaseous/water mist fire suppression system, actuated by a fire alarm system using smoke detection. This approach reduces the risk to water damage resulting from accidental discharge from the fire sprinkler protection. This protection should be considered primarily for the Administration Building Lab Computer Room (1 system) and for the Ops Center Control Room and Communications Room (1 system with 2 zone control valves). Approximate installation costs for the Vortex system are summarized in Table 6 below.

- The District should consider the installation of HSSD Early detection of fires in the spaces protected by preaction fire sprinklers or Vortex fire suppression systems (identified above) and for the protection of the Administration Penthouse Phone and Communications Room. In the event that the District desires not to provide HSSD for areas protected by the fire suppression system, the existing (or new) spot type smoke detectors may also be used.

Table 5. Preaction Sprinkler System Installation Costs for Facilities Evaluated

Preaction System Installations		
Recommendation	**Estimated Cost**	**Comments**
Administration Building Lab Computer Room		
Complete General Recommendations 1 through 5	NA	NA
Install HSSD smoke detection system.	$3,425	Complete system installation. Existing smoke detectors may be used if the existing control unit remains.
Install new releasing fire alarm control unit	$3,000	Single zone releasing control unit. Existing control unit may be used, depending upon voltages for the solenoids on the Vortex System.
Install preaction fire sprinkler system.[1]	$17,000	Includes system piping & nozzles. Service connection costs not included.
Administration Building Penthouse Phone & Communications Room		
Complete General Recommendations 1 through 4.	NA	NA
Install HSSD smoke detection system.	$3,425.00	Complete system installation.
Ops Center Control Room		
Complete General Recommendations 1 through 5	NA	NA

Preaction System Installations		
Recommendation	**Estimated Cost**	**Comments**
Install HSSD smoke detection system.	$3,425.00	Complete system installation. Existing smoke detectors may be used if the existing control unit remains.
Install new releasing fire alarm control unit	$3,000	Two zone releasing control unit. Existing control unit may be used, depending upon voltages for the solenoids on the Vortex System.
Install preaction fire sprinkler system.[1]	$17,550	Includes system piping & nozzles. Service connection costs not included.
Ops Center Computer Room		
Complete General Recommendations 1 through 5	NA	NA
Install HSSD smoke detection system.	$3,425	Complete system installation. Existing smoke detectors may be used if the existing control unit remains.
Install new releasing fire alarm control unit	NA	Use control unit installed for the Ops Center Control Room
Install preaction fire sprinkler system.[1]	$9,200	A single preaction valve will serve both spaces.

1. Assumes adequate fire water supply is located in proximity of space protected.

Table 6. Vortex System Installation Costs for Facilities Evaluated

Vortex System Installations		
Recommendation	**Estimated Cost**	**Comments**
Administration Building Lab Computer Room		
Complete General Recommendations 1 through 5	NA	NA
Install HSSD smoke detection system.	$3,425	Complete system installation. Existing smoke detectors may be used if the existing control unit remains.
Install new releasing fire alarm control unit	$3,000	Single zone releasing control unit. Existing control unit may be used, depending upon voltages for the solenoids on the Vortex System.
Install Vortex fire suppression system.	$ 24,440	Includes system piping & nozzles.

Vortex System Installations		
Recommendation	**Estimated Cost**	**Comments**
Administration Building Penthouse Phone & Communications Room		
Complete General Recommendations 1 through 4. If District elects to install Vortex System in this room, then complete General Recommendation 5 as well.	NA	NA
Install HSSD smoke detection system.	$3,425.00	Complete system installation.
Ops Center Control Room		
Complete General Recommendations 1 through 5	NA	NA
Install HSSD smoke detection system.	$3,425	Complete system installation. Existing smoke detectors may be used if the existing control unit remains.
Install new releasing fire alarm control unit	$3,000	Two zone releasing control unit. Existing control unit may be used, depending upon voltages for the solenoids on the Vortex System.
Install Vortex fire suppression system.	$49,450	Includes system piping & nozzles.
Ops Center Computer Room		
Complete General Recommendations 1 through 5	NA	NA
Install HSSD smoke detection system.	$3,425.00	Complete system installation. Existing smoke detectors may be used if the existing control unit remains.
Install new releasing fire alarm control unit	NA	Use control unit installed for the Ops Center Control Room
Install Vortex fire suppression system.	$3,800	The Vortex system will be a multi-zone system. The Vortex water tank, cylinders, controls, valves, etc. provided for the Ops Center Control Room will also be used for the Ops Center Computer Room. This cost includes the necessary piping.

(Exhibit F - Example Standard Consulting Agreement)

CONSULTING AND PROFESSIONAL SERVICES AGREEMENT FOR EAST BAY MUNICIPAL UTILITY DISTRICT
MWWTP HVAC and Building Improvements

THIS Agreement is made and entered into this _____ day of ***(month)***, 201_, by and between **EAST BAY MUNICIPAL UTILITY DISTRICT**, a public entity, hereinafter called "DISTRICT," and ***(CONSULTANT'S FULL LEGAL NAME, BOLD, ALL CAPS followed by type of entity [corporation, etc.])***, hereinafter called "CONSULTANT."

WITNESSETH

WHEREAS, DISTRICT requires consulting services for ***improvements to the Main Wastewater Treatment Plant (MWWTP) Heating, Ventilation, and Air Conditioning (HVAC) systems, fire protection systems, and building roof***; and

WHEREAS, CONSULTANT has submitted a proposal to provide consulting services ***preparation of predesign documents, preparation of design documents, support during bid phase, and engineering support during construction*** for the ***MWWTP HVAC and Building Improvements*** and CONSULTANT represents that it has the experience, licenses, qualifications, staff expertise and where necessary the required Department of Industrial Relations (DIR) registration to perform said services in a professional and competent manner; and

WHEREAS, DISTRICT Board of Directors has authorized the contract by Motion Number _____;

ARTICLE 1 - SCOPE OF WORK

1.1 CONSULTANT agrees to furnish services set forth in Exhibit A, Scope of Services, attached hereto and incorporated herein. The services authorized under this Agreement shall also include all reports, manuals, plans, and specifications as set forth in Exhibit A.

1.2 CONSULTANT's work products shall be completed and submitted in accordance with DISTRICT's standards specified, and according to the schedule listed, in Exhibit A. The completion dates specified herein may be modified by mutual agreement between DISTRICT and CONSULTANT provided that DISTRICT's Project Manager notifies CONSULTANT of modified completion dates by letter. CONSULTANT agrees to diligently perform the services to be provided under this Agreement. In the performance of this Agreement, time is of the essence.

1.3 It is understood and agreed that CONSULTANT has the professional skills necessary to perform the work agreed to be performed under this Agreement, that DISTRICT relies upon the professional skills of CONSULTANT to do and perform CONSULTANT's work in a skillful and professional manner, and CONSULTANT thus agrees to so perform the work. CONSULTANT represents that it has all the necessary licenses to perform the work and shall maintain them during the term of this Agreement. CONSULTANT agrees that the work performed under this Agreement shall follow practices usual and customary to the ***engineering*** profession and that CONSULTANT is the engineer in responsible charge of the work for all activities performed under this Agreement. Acceptance by DISTRICT of the work performed under this Agreement does not operate as a release of CONSULTANT from such professional responsibility for the work performed.

1.4 CONSULTANT agrees to maintain in confidence and not disclose to any person or entity, without DISTRICT's prior written consent, any trade secret or confidential information, knowledge or data relating to the products, process, or operation of DISTRICT. CONSULTANT further agrees to maintain in confidence and not to disclose to any person or entity, any data, information, technology, or material developed or obtained by CONSULTANT during the term of this Agreement. The covenants contained in this paragraph shall survive the termination of this Agreement for whatever cause.

1.5 The originals of all computations, drawings, designs, graphics, studies, reports, manuals, photographs, videotapes, data, computer files, and other documents prepared or caused to be prepared by CONSULTANT or its subconsultants in connection with these services shall be delivered to and shall become the exclusive property of DISTRICT. DISTRICT is licensed to utilize these documents for DISTRICT applications on other projects or extensions of this project, at its own risk. CONSULTANT and its subconsultants may retain and use copies of such documents, with written approval of DISTRICT.

1.6 CONSULTANT is an independent contractor and not an employee of DISTRICT. CONSULTANT expressly warrants that it will not represent that it is an employee or servant of DISTRICT.

1.7 CONSULTANT is retained to render professional services only and all payments made are compensation solely for such services as it may render and recommendations it may make in carrying out the work.

1.8 It is further understood and agreed by the parties hereto that CONSULTANT in the performance of its obligations hereunder is subject to the control or direction of DISTRICT as to the designation of tasks to be performed, the results to be accomplished by the services hereunder agreed to be rendered and performed, and not the means, methods, or sequence used by the CONSULTANT for accomplishing the results.

1.9 If, in the performance of this agreement, any third persons are employed by CONSULTANT, such person shall be entirely and exclusively under the direction, supervision, and control of CONSULTANT. All terms of employment, including hours,

wages, working conditions, discipline, hiring, and discharging, or any other terms of employment or requirements of law, shall be determined by CONSULTANT, and DISTRICT shall have no right or authority over such persons or the terms of such employment.

1.10 It is further understood and agreed that as an independent contractor and not an employee of DISTRICT, neither the CONSULTANT nor CONSULTANT's assigned personnel shall have any entitlement as a DISTRICT employee, right to act on behalf of DISTRICT in any capacity whatsoever as agent, nor to bind DISTRICT to any obligation whatsoever. CONSULTANT shall not be covered by DISTRICT's worker's compensation insurance; nor shall CONSULTANT be entitled to compensated sick leave, vacation leave, retirement entitlement, participation in group health, dental, life or other insurance programs, or entitled to other fringe benefits payable by DISTRICT to employees of DISTRICT.

ARTICLE 2 - COMPENSATION

2.1 For the Scope of Services described in Exhibit A, DISTRICT agrees to pay CONSULTANT actual costs incurred, subject to a Maximum Cost Ceiling of $***(dollars)***, plus a Professional Fee (prorata dollar profit). The Professional Fee shall be subject to a Professional Fee Ceiling of $***(dollars)***. Total compensation under the Agreement shall not exceed a Maximum Agreement Ceiling of $***(dollars)***. Compensation for services shall be in accordance with the method and amounts described in Exhibit B, attached hereto and incorporated herein. CONSULTANT acknowledges that construction work on public works projects requires DIR registration and is subject to prevailing wage rates and includes work performed during the design and preconstruction phases of construction including, but not limited to, inspection and land surveying work. CONSULTANT certifies that the proposed cost and pricing data used herein reflect the payment of prevailing wage rates where applicable and are complete, current, and accurate.

2.2 In case of changes affecting project scope resulting from new findings, unanticipated conditions, or other conflicts or discrepancies, CONSULTANT shall promptly notify DISTRICT of the identified changes and advise DISTRICT of the recommended solution. Work shall not be performed on such changes without prior written authorization of DISTRICT.

ARTICLE 3 - NOTICE TO PROCEED

3.1 This Agreement shall become effective upon execution of the second signature. CONSULTANT shall commence work upon receipt of DISTRICT's Notice to Proceed, which shall be in the form of a letter signed by DISTRICT's Project Manager. DISTRICT's Notice to Proceed will authorize the Contracted Services described in Exhibit A with ceiling prices described in ARTICLE 2 – COMPENSATION. No work shall commence until the Notice to Proceed is issued.

ARTICLE 4 - TERMINATION

4.1 This Agreement may be terminated by DISTRICT immediately for cause or upon 10 days written notice, without cause, during the performance of the work.

4.2 If this Agreement is terminated CONSULTANT shall be entitled to compensation for services satisfactorily performed to the effective date of termination; provided however, that DISTRICT may condition payment of such compensation upon CONSULTANT's delivery to DISTRICT of any and all documents, photographs, computer software, videotapes, and other materials provided to CONSULTANT or prepared by CONSULTANT for DISTRICT in connection with this Agreement. Payment by DISTRICT for the services satisfactorily performed to the effective date of termination, shall be the sole and exclusive remedy to which CONSULTANT is entitled in the event of termination of the Agreement and CONSULTANT shall be entitled to no other compensation or damages and expressly waives same. Termination under this Article 4 shall not relieve CONSULTANT of any warranty obligations or the obligations under Articles 1.4 and 7.1.

4.3 This Agreement may be terminated by CONSULTANT upon 10 days written notice to DISTRICT only in the event of substantial failure by DISTRICT to fulfill its obligations under this Agreement through no fault of the CONSULTANT.

4.4 If this Agreement is terminated, payment of the Professional Fee shall be in proportion to the percentage of work that DISTRICT judges satisfactorily performed up to the effective date of termination. The Professional Fee shall be prorated based upon a ratio of the actual Direct Labor and Indirect Costs expended to date divided by the Cost Ceiling.

ARTICLE 5 - PROJECT MANAGERS

5.1 DISTRICT designates ***(District Project Manager's name)*** as its Project Manager, who shall be responsible for administering and interpreting the terms and conditions of this Agreement, for matters relating to CONSULTANT's performance under this Agreement, and for liaison and coordination between DISTRICT and CONSULTANT. CONSULTANT may be requested to assist in such coordinating activities as necessary as part of the services. In the event DISTRICT wishes to make a change in the DISTRICT's representative, DISTRICT will notify CONSULTANT of the change in writing.

5.2 CONSULTANT designates ***(Consultant Project Manager's name)*** as its Project Manager, who shall have immediate responsibility for the performance of the work and for all matters relating to performance under this Agreement. Any change in CONSULTANT designated personnel or subconsultant shall be subject to approval by the DISTRICT Project Manager.

ARTICLE 6 - CONTRACT EQUITY PROGRAM COMPLIANCE

6.1 CONSULTANT expressly agrees that this Agreement is subject to DISTRICT's Contract Equity Program ("CEP"). CONSULTANT is familiar with the DISTRICT's CEP and Equal Opportunity Guidelines, and has read and understood all of the program requirements. CONSULTANT understands and agrees to comply with the CEP and all requirements therein, including each of the Good Faith Efforts. CONSULTANT further understands and agrees that non-compliance with the CEP requirements may result in termination of this Agreement.

6.2 Designated CEP compliance for the duration of this Agreement is listed in Exhibit C, which is attached hereto and incorporated herein. CONSULTANT shall maintain records of the total amount actually paid to each subconsultant. Any change of CONSULTANT'S listed subconsultants shall be subject to approval by the DISTRICT'S Project Manager.

ARTICLE 7 - INDEMNIFICATION AND INSURANCE

7.1 Indemnification

PROFESSIONAL SERVICE PROVIDER expressly agrees to defend, indemnify, and hold harmless the District and its Directors, officers, agents, and employees from and against any and all loss, liability, expense, claims, suits, and damages, including attorneys' fees, arising out of or resulting from GENERAL OR PROFESSIONAL SERVICE PROVIDER's, its associates', employees', subcontractors', or other agents' negligent acts, errors or omissions, or willful misconduct, in the operation and/or performance under this Agreement.

7.2 Insurance Requirements

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall take out and maintain during the life of the Agreement all the insurance required in this section, and if requested shall submit certificates for review and approval by the District. The Notice to Proceed shall not be issued, and GENERAL OR PROFESSIONAL SERVICE PROVIDER shall not commence work until such insurance has been approved by the District. The certificates shall be on forms approved by the District. Acceptance of the certificates shall not relieve GENERAL OR PROFESSIONAL SERVICE PROVIDER of any of the insurance requirements, nor decrease the liability of GENERAL OR PROFESSIONAL SERVICE PROVIDER. The District reserves the right to require GENERAL OR PROFESSIONAL SERVICE PROVIDER to provide insurance policies for review by the District.

For any coverage that is provided on a claims-made coverage form (which type of form is permitted only where specified) the retroactive date must be shown and must be before the date of this Agreement, and before the beginning of any Services related to this Agreement.

The insurance requirements under this Agreement shall be the greater of (1) the minimum coverage and limits specified in this Agreement; or (2) the broader coverage and maximum limits of coverage of any insurance policies or proceeds available to the Named Insured. It is agreed that these insurance requirements shall not in any way act to reduce coverage that is broader or that includes higher limits than the minimums required herein. No representation is made that the minimum insurance requirements of this Agreement are sufficient to cover the obligations of the Contractor.

7.6 Workers Compensation Insurance

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall take out and maintain during the life of the Agreement Workers Compensation Insurance for all of its employees on the project. In lieu of evidence of Workers Compensation Insurance, the District will accept a Self-Insured Certificate from the State of California. GENERAL OR PROFESSIONAL SERVICE PROVIDER shall require any subcontractor to provide it with evidence of Workers Compensation Insurance.

7.7 Professional Liability Insurance (Errors and Omissions)

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall maintain during the life of the agreement professional liability insurance with a minimum of $2,000,000/Occurrence. A three year tail is required if coverage on a claims-made basis. A deductible may be acceptable upon approval by the District. The policy will provide 30 days advance written notice to the District for cancellation or reduction in coverage. The Consultant shall require any subcontractor to provide evidence of the same professional liability insurance coverage.

7.8 Commercial General Liability Insurance

GENERAL OR PROFESSIONAL SERVICE PROVIDER shall take out and maintain during the life of the Agreement Automobile and General Liability Insurance that provides protection from claims which may arise from operations or performance under this Agreement. If GENERAL OR PROFESSIONAL SERVICE PROVIDER elects to self-insure (self-fund) any liability exposure during the contract period above $50,000, GENERAL OR PROFESSIONAL SERVICE PROVIDER is required to notify the District immediately. Any request to self-insure must first be approved by the District before the changed terms are accepted. GENERAL OR PROFESSIONAL SERVICE PROVIDER shall require any subcontractor or Professional Service Provider to provide evidence of liability insurance coverages.

The amounts of insurance shall be not less than the following:

$2,000,000/Occurrence, Bodily Injury, Property Damage -- Automobile.

$2,000,000/Occurrence, Bodily Injury, Property Damage -- General Liability.

The following coverages or endorsements must be included in the policy(ies):

1. The District, its Directors, officers, and employees are Additional Insureds in the policy(ies) as to the work being performed under the contract.

2. The coverage is Primary and non-contributory to any other applicable insurance carried by the District.

3. The policy(ies) covers contractual liability.

4. The policy(ies) is written on an occurrence basis.

5. The policy(ies) cover(s) District's Property in Consultant's care, custody and control.

6. The policy(ies) covers personal injury (libel, slander, and wrongful entry and eviction) liability.

7. The policy(ies) covers explosion, collapse, and underground hazards.

8. The policy(ies) covers products and completed operations.

9. The policy(ies) covers the use of owned, non-owned, and hired automobiles.

10. The policy(ies) and/or a separate pollution liability policy(ies) shall cover pollution liability for claims related to the release or the threatened release of pollutants into the environment arising out of or resulting from Consultant's performance under this agreement.

11. The policy(ies) will not be canceled nor the above coverages/endorsements reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

The policy(ies) will not be canceled nor the above coverages/endorsements reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

7.9 Waiver of Subrogation Rights

Waiver of Subrogation. Contractor agrees to waive any and all rights of recovery against EBMUD regardless of applicability of any insurance proceeds and to require all indemnifying parties to do likewise. General and Automobile liability and Workers' Compensation policy(ies), including any applicable excess and umbrella insurance, must contain a waiver of subrogation endorsement providing that customer and each insurer waive any and all rights of recovery by subrogation, or otherwise, against the EBMUD, its directors, board and committee members, officers, officials, agents, volunteers, and

employees. Customer shall defend and pay any and all damages, fees, costs, etc. arising out of or resulting from, customer's failure to provide the waiver of subrogation from the insurance carrier.

ARTICLE 8 - NOTICES

Any notice which DISTRICT may desire or is required at any time to give or serve CONSULTANT may be delivered personally, or be sent by United States mail, postage prepaid, addressed to:

(consulting firm's name)
(address)
Attention: ***(contact, usually the consultant's project manager)***,

or at such other address as shall have been last furnished in writing by CONSULTANT to DISTRICT.

Any notice which CONSULTANT may desire or is required at any time to give or serve upon DISTRICT may be delivered personally at EBMUD, 375 - 11th Street, Oakland, CA 94607-4240, or be sent by United States mail, postage prepaid, addressed to:

Director of ***(Wastewater Department or Engineering and Construction Department)***
P.O. Box 24055
Oakland, CA 94623-1055

or at such other address as shall have been last furnished in writing by DISTRICT to CONSULTANT.

Such personal delivery or mailing in such manner shall constitute a good, sufficient and lawful notice and service thereof in all such cases.

ARTICLE 9 - MISCELLANEOUS

9.1 This Agreement represents the entire understanding of DISTRICT and CONSULTANT as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered hereunder. This Agreement may only be modified by amendment in writing signed by each party.

9.2 This Agreement is to be binding on the successors and assigns of the parties hereto. The services called for herein are deemed unique and CONSULTANT shall not assign, transfer or otherwise substitute its interest in this Agreement or any of its obligations hereunder without the prior written consent of DISTRICT.

9.3 Should any part of this Agreement be declared by a final decision by a court or tribunal of competent jurisdiction to be unconstitutional, invalid or beyond the authority of either party to enter into or carry out, such decision shall not affect the validity of the remainder

of this Agreement, which shall continue in full force and effect, provided that the remainder of this Agreement can be interpreted to give effect to the intentions of the parties.

9.4 Multiple copies of this Agreement may be executed by the parties and the parties agree that the Agreement on file at the DISTRICT is the version of the Agreement that shall take precedence should any differences exist among counterparts of the Agreement.

9.5 This Agreement and all matters relating to it shall be governed by the laws of the State of California.

9.6 The District's waiver of the performance of any covenant, condition, obligation, representation, warranty or promise in this agreement shall not invalidate this Agreement or be deemed a waiver of any other covenant, condition, obligation, representation, warranty or promise. The District's waiver of the time for performing any act or condition hereunder does not constitute a waiver of the act or condition itself.

9.7 There shall be no discrimination in the performance of this contract, against any person, or group of persons, on account of race, color, religion, creed, national origin, ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), veteran or military status, family or medical leave status, genetic information, or sexual orientation. CONSULTANT shall not establish or permit any such practice(s) of discrimination with reference to the contract or any part. CONSULTANTS determined to be in violation of this section shall be deemed to be in material breach of this Agreement.

Consultant shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

CONSULTANT shall include the nondiscrimination provisions above in all subcontracts.

9.8 CONSULTANT affirms that it does not have any financial interest or conflict of interest that would prevent CONSULTANT from providing unbiased, impartial service to the DISTRICT under this Agreement.

ARTICLE 10 - TERM

Unless terminated pursuant to Article 4 herein, this Agreement shall expire when all tasks have been completed and final payment has been made by DISTRICT.

IN WITNESS WHEREOF, the parties hereto each herewith subscribe the same in duplicate.

EAST BAY MUNICIPAL UTILITY DISTRICT

By: _____ Date _____

(Name),
(Insert title - Director of Engineering and Construction or Manager of Support Services)

Approved As To Form

By:_____
for the Office of the General Counsel

(CONSULTING FIRM'S NAME, ALL CAPS & BOLD)

By:_____ Date _____

(Name),
(Title)

Rev. 7/10/18

EXHIBIT A

East Bay Municipal Utility District
(Project Title)

SCOPE OF SERVICES

I. CONSULTANT SERVICES

CONSULTANT shall provide the following:

Contracted Services

II. PROJECT SCHEDULE

EXHIBIT B

East Bay Municipal Utility District
Main Wastewater Treatment Plant HVAC and Building Improvements

COMPENSATION

Compensation for services provided in Exhibit A, SCOPE OF SERVICES, shall be in accordance with the methods and specific amounts described in this Exhibit.

1. DISTRICT shall pay CONSULTANT only the actual costs incurred, subject to the agreed cost ceiling. CONSULTANT certifies that the cost and pricing information used herein are complete, current and accurate. CONSULTANT acknowledges that it will expend public funds and hereby agrees to use every appropriate method to contain its fees and minimize costs under this Agreement.

2. Compensation for CONSULTANT services authorized shall be on a cost reimbursement basis and include Direct Labor, Indirect Costs, Subconsultant Services, Other Direct Costs, and a Professional Fee. Costs to be paid comprise the following:

   2.1 Direct Labor

   Direct labor costs shall be the total number of hours worked on the job by each employee times the actual hourly rate for such employee's labor. Hours worked shall be rounded-up to the nearest quarter-hour (0.25) increment. Labor costs for principals shall be based upon the actual hourly rate of pay for those individuals. Labor rates shall be based on a normal 8-hour day, 40-hour week. DISTRICT will pay all personnel at their regular rate including any work performed on overtime or on holidays or weekends.

   2.2 Indirect Costs

   DISTRICT shall pay CONSULTANT an overhead expense equal to ***(insert overhead rate)*** percent of labor costs incurred by CONSULTANT. CONSULTANT acknowledges and agrees that this overhead compensation is in lieu of itemized payments for indirect and overhead expenses which includes, but is not limited to:

   - Clerical, word processing and/or accounting work.
   - Vehicle usage and mileage between CONSULTANT's office and DISTRICT offices or work locations within DISTRICT service area. For work outside of the DISTRICT's services area, DISTRICT approval to charge for vehicle usage and mileage and other travel expenses must be obtained prior to the expenses being incurred.

- Parking (DISTRICT does NOT provide parking to CONSULTANT in the DISTRICT Administration Building, located at 375 11th Street, Oakland, California. CONSULTANT shall be responsible for parking elsewhere).
- Postage, or for certified or registered mail. Extraordinary postage, overnight delivery, or messenger delivery charges must be approved in advance.
- Routine copying costs for in-house copying.
- Local telephone charges, including cellular phone, modem and telecopier/FAX charges.
- Office space lease.
- Office supplies.
- Computer equipment.
- Computer usage charges.
- Books, publications and periodicals.
- Insurance.
- Miscellaneous hand tools or equipment rental.
- Safety training, seminars or continuing education.
- Utilities.
- Local meals, transportation or other travel charges.
- Inadequately described or miscellaneous expenses.

The above items are illustrative, rather than exhaustive.

2.3 Subconsultant Services

Subconsultant services shall be billed at cost (plus a ***(insert rate)*** percent markup).

2.4. Other Direct Costs

Other Direct Costs shall be approved by DISTRICT in advance in writing, and shall be billed at cost, without markup. These costs include, but are not limited to the following:

2.4.1. Automobile expenses at ***(insert rate)*** cents per mile when CONSULTANT is required to travel outside of the DISTRICT's service area. Mileage will NOT be reimbursed for rental car expenses, where the rental agreement specifies unlimited mileage.

2.4.2. DISTRICT will pay for necessary and reasonable travel expenses provided the travel is approved in advance by DISTRICT Project Manager, and providing that:

- Each expense is separately identified (air fare, hotel, rental car) with an amount and date incurred. Confirming documents may be requested.

- Charged mileage for vehicle mileage shall not exceed the current allowable Internal Revenue Service rate.
- Air travel is coach or economy rate for refundable tickets. Business and first class rates will not be reimbursed.
- Lodging accommodations are moderately priced.
- Meal charges are reasonable. (Reimbursement for meals will only be made in conjunction with out-of-town travel.)
- Taxis or shuttles are used rather than rental cars whenever cost effective.
- Rental cars are intermediate or compact class only.

2.5 Professional Fee

As a portion of the total compensation to be paid to CONSULTANT, DISTRICT shall pay the Professional Fee, subject to the agreed Professional Fee Ceiling of $***(dollars)*** as specified in Exhibit B-1, as profit for services rendered by CONSULTANT covered by this Agreement. CONSULTANT shall earn the Professional Fee based on a ***(insert rate)*** percent markup of CONSULTANT's Direct Labor and Indirect Costs billed and approved.

2.6 Budget Amounts

	Contracted Services
Cost Ceiling	$***(dollars)***
Professional Fee Ceiling	***(dollars)***
Agreement Ceiling	***(dollars)***

The Cost Ceiling shown above is based upon the cost estimate and labor hours attached hereto as Exhibit B-1 and Exhibit B-2. Costs described above, comprising Direct Labor, Indirect Costs, Subconsultant Services, Other Direct Costs, and Professional Fee, shall be payable up to the Agreement Ceiling as specified herein.

2.7 Billing and Payment

CONSULTANT shall invoice DISTRICT monthly for the actual costs incurred and a prorated Professional Fee for work performed during the previous month. Actual costs shall include Direct Labor, Indirect Costs, Subconsultant Services, and Other Direct Costs as specified herein. Actual costs shall be invoiced by task as described in Exhibit A. Invoices shall set forth a description of the actual costs incurred and the services performed, the date the services were performed and the amount of time spent rounded to the nearest quarterly hour increment (.25) on each date services were performed and by whom. Supporting documentation for the invoice shall be organized to clearly identify the task charged and shall be

supported by such copies of invoices, payroll records, and other documents as may be required by DISTRICT to authenticate invoiced costs. Copies of all invoices from any subconsultant(s) and outside service(s) shall be attached. DISTRICT shall pay CONSULTANT within thirty (30) days, upon receipt of a proper CONSULTANT invoice, provided that all invoices are accompanied by sufficient cost documentation, and DISTRICT Form P-47 (Subcontractor Payment Report - CEP Participation), to allow the determination of the reasonableness and accuracy of said invoice.

A ceiling price is in effect for the entire Scope of Services. If the authorized Agreement Ceiling, including the authorized Professional Fee Ceiling, is reached, CONSULTANT shall complete the agreed-upon work for the authorized Agreement Ceiling. Labor hours may be reallocated within the tasks without renegotiation of the Agreement with written approval from the DISTRICT Project Manager in such a manner so as not to exceed the Agreement ceiling price. In no event shall the Cost Ceiling of the Agreement or the Professional Fee Ceiling be increased unless there is a written amendment of this Agreement.

2.8 Budget Status Reports

For the duration of this Agreement, the CONSULTANT shall provide DISTRICT with ***("bi-weekly" or "monthly" depending on duration of project)*** budget status reports that include, in tabular or graphical format, for each report period: (1) the original cumulative projected cash flows for the duration of the project (prepared at the start of the project), (2) the actual cash flows for the work completed to date, (3) the current projected cash flows to complete the project, and (4) the earned value (the amount of work actually completed to date compared to the budget expended). Current projected cash flows shall be based on all CONSULTANT and subconsultant time sheets up to a date within 3 weeks of the date of the budget status report.

(Note: this table is prepared by the consultant. The following is provided to show format.)

EXHIBIT B-1

East Bay Municipal Utility District
Main Wastewater Treatment Plant HVAC and Building Improvements

COST DISTRIBUTION

	Consultant						Subconsultants							
	Direct Labor						Sub. #1			Sub. #2				
	Project Manager	Project Engineer	Drafting	Total	Indirect Costs	ODCs*	Project Eng.	Assist. Eng.	Total Cost	Project Eng.	Assist. Eng	Total Cost	Profes-sional Fee**	Total Cost
Salary Rate ($/hr.)	*(****)*	*(****)*	*(****)*				*(****)*	*(****)*		*(****)*	*(****)*			
Services														
I. Contracted Services														
Task 1.1:														
Task 2.1:														
Task 2.2:														
Task 2.3														
Task 2.4														
Subtotal I.							***(***)***	***(***)***	***(***)***	***(***)***	***(***)***	***(***)***		
Task 3:														
Task 4:														
Task 5:														
Subtotal II.							***(***)***	***(***)***	***(***)***	***(***)***	***(***)***	***(***)***		
TOTAL Agreement (Total of Subtotals I. & II.)														

* ODCs = Other Direct Costs.
** Professional Fee on consultant Direct Labor& Indirect Costs only. Should not include prime consultant markup on subconsultants.
*** Amount includes prime consultant markup on subconsultant.
****** *Insert salary rate.***

(Note: this table is prepared by the consultant. The following is provided to show format.)

EXHIBIT B-2

East Bay Municipal Utility District
Main Wastewater Treatment Plant HVAC and Building Improvements

LABOR DISTRIBUTION

Services***(*)***	Consultant				Subconsultants						
					Sub. #1			Sub. #2			
	Project Manager	Project Engineer	Drafting	Subtotal	Project Eng.	Assist. Eng.	Subtotal	Project Eng.	Assist. Eng	Subtotal	Total
I. Contracted Services											
Task 1.1:											
Task 2.1:											
Task 2.2:											
Task 2.3:											
Task 2.4:											
Subtotal											
Task 3:											
Task 4:											
Task 5:											
Subtotal											
TOTAL											

(* Include both consultant and subconsultant hours. Also, include the percent time commitment for key personnel if a critical issue for success of the project.)

EXHIBIT C

East Bay Municipal Utility District
Main Wastewater Treatment Plant HVAC and Building Improvements

CEP COMPLIANCE

FIRMS UTILIZED		MINIMUM AMOUNT*	MINIMUM PERCENT**
(Name of Subconsultant's firm)		$***(dollars)***	***(1 to 99)***
(Name of Subconsultant's firm)		$***(dollars)***	***(1 to 99)***
	TOTAL	$***(dollars)***	***(1 to 99)***

* Does not include consultant's markup. ***(Include this footnote only if your contract includes markup on subconsultants.)***

** Based on a Maximum Services Agreement Ceiling amount of $***(dollars)***.