Business Services
Contracts Office
5735 47th Avenue ● Sacramento, CA 95824
(916) 643-2464
Janea Marking, Chief Business Officer
Robert Aldama, Purchasing Manager II

ADDENDUM NO. 1

Date: May 17, 2024

Issued by: Sacramento City Unified School District

Project: **Project #: 0525-442**
John F Kennedy High School Swimming Pool Upgrades

This addendum shall supersede the original Information, attachments, and specifications regarding Project No. 0525-442 where it adds to, clarifies, or otherwise modifies them. All other conditions and any previous addenda shall remain unchanged.

Part A – Bidding and Contract Requirements

Conditions of the Contract – Division 0 - Section 00 73 56 Hazardous Materials Procedures and Requirements

1. Added the Hazardous Materials Survey and Final Report by Entek Consulting Group, Inc. to the bid documents

"Please note that the hazardous materials specification section(s) have been completed by the District's Hazardous Materials Consultant and have not been prepared or reviewed by the Architect. These specification sections are included in the Project bid documents. Questions regarding the hazardous materials specification section(s) related to asbestos and lead paint survey and/or abatement documentation need to be submitted per Instructions to Bidders.

2. Add Specification 23 05 93 Testing, Adjusting and Balancing for HVAC to bid documents.

3. Add Specification 23 80 00 Heating, Ventilating and Air Conditioning to Bid documents

4. Replace the following sheets with the attached to the Bid Documents:

- GL111 Life Safety Floor Plan – Pool
- AD111 Demolition Floor Plan – Level 1
- A-111 Floor Plan – Level 1
- P-002 Plumbing Equipment Schedule
- P-411 Enlarged Plumbing Demo & Construction Plan
- P-501 Plumbing Details
- SP-115 Swimming Pool/ Diving Pool Piping Plan
- SP-502 Details

END OF ADDENDUM NO. 1

Acknowledgement of this Addendum will be required at time of bid: June 5, 2024 at 2:00 pm.

ENTEK
CONSULTING GROUP, INC.
4200 Rocklin Road, Suite 7, Rocklin, CA 95677 Phone (916) 632-6800 Fax (916) 632-6812 www.entekgroup.com

HAZARDOUS MATERIALS SURVEY
FINAL REPORT

OWNER/CLIENT

Sacramento City Unified School District
5735 47th Avenue
Sacramento, CA 95824

CONTACT

Mr. Chris Ralston, Director III
Facilities Management, Maintenance & Operations, and Resource Management

SURVEY ADDRESS

John F Kennedy High School
6715 Gloria Drive
Sacramento, CA 95831

BUILDING(S) SURVEYED

Pool Area, Pool Equipment Room, Pool Area Restrooms
Pool Upgrade Project

PREPARED BY

Blake Howes
CAC #13-5015 & CDPH #I/A 3315
Entek Consulting Group, Inc.
4200 Rocklin Road, Suite 7
Rocklin, CA 95677

Entek Project #24-7160

May 15, 2024

ENTEK

TABLE OF CONTENTS

Executive Summary

The United States Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants (US EPA NESHAP), 40 CFR Part 61 - Nov. 20, 1990, requires an owner or operator of a demolition or renovation project to thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos-containing materials (ACM) prior to the commencement of that project.

This inspection report was requested by Mr. Chris Ralston, Director III of the Facilities Management, Maintenance & Operations, and Resource Management department for the Sacramento City Unified School District (SCUSD).

The purpose of the inspection was to comply with US EPA NESHAP requirements and the Sacramento Metropolitan Air Quality Management District (SMAQMD) which has jurisdiction for this project site to determine if asbestos containing materials are present which may be impacted during an upcoming project, which will include upgrades to the pool area, pool equipment room, and some minor work in pool restrooms of JFK High School located at 6715 Gloria Drive Sacramento, CA 95831.

Paints were also tested for lead content for compliance with Cal/OSHA lead in construction regulations. It is our understanding the school was originally constructed in the 1950's.

The attached drawings show approximate sample locations and also identify those bulk sample materials analyzed and found to contain asbestos greater than 1% with a (+) after the sample number. Materials analyzed and found to contain less than 1% asbestos or reported as none detected have a (-) after each sample number.

Materials are classified in the tables of this report as regulated asbestos containing material (RACM), Category I (CAT-I) or Category II (CAT-II) ACM, or asbestos containing construction material (ACCM), which included collecting multiple samples of some materials. Contractors and other individuals who view the sample locations and associated results indicated with either a (-) or a (+) on the drawing to make determinations take the risk of misidentifying a material and may arrive at determinations which are in direct conflict with the written findings of this report. This use of the drawing and the information provided on it relating to individual sample results in determining if a material does or does not contain asbestos is not recommended.

This is a summary of the report. The report must be read in its entirety, and the reader must review all the detailed information provided in the body of the report prior to making any interpretations, or conclusions pertaining to the information. Any conclusions made by the reader about the information provided in the body of this report which are contradictory or not included in this report are the responsibility of the reader.

Asbestos

On May 3, 2024 Entek conducted a survey specific to areas designated by the owner's representative which included the pools, surrounding deck and diving boards, the pool equipment and pump room, and several adjacent restrooms.

The results of testing for asbestos during this survey indicate asbestos is present in pipe insulation, tank insulation, boiler gaskets, and possible boiler materials in the pool equipment and pump room. Specifics pertaining to individual materials can be found in later sections of this report.

Lead

Entek investigated existing paints, applied coatings and glazed ceramic tiles in an effort to determine if lead was present in these materials. The materials in the following bullet point list were found to contain more than 5,000 parts per million (ppm) lead and are classified as lead-based paint (LBP). If more than 100 square feet of these paints, coatings, or glazed ceramic tiles are impacted by a "trigger task", prior notification to Cal/OSHA will be required.

- Beige Colored Paint - Pool Equipment Room on Drywall Walls
- Green Colored Paint - Pool Equipment Room on Metal Poles
- Red Colored Paint - Pool Equipment Room on Metal Hand Rails

Other paints or applied coatings as indicated in the following bullet point list were determined to contain lead in amounts less than 5,000 ppm and are classified as lead containing paint (LCP). Any work designated by California Occupational Safety Health Administration (Cal/OSHA) as a "trigger task" which will impact these paints, coatings, or materials must be done by properly trained personnel, in compliance with all lead related Cal/OSHA regulations and requirements.

- Beige Colored Paint - Pool Equipment Room on Metal Ceiling Panels
- Gray Colored Paint - Pool Equipment Room on Metal Roof Trusses
- Gray Colored Paint - Pool Equipment Room on Metal Boiler Unit
- Light Blue Colored Paint - Pool Equipment Room on Metal Pipes
- Gray Colored Paint - Pool Area on Diving Board Support Columns
- Beige Colored Paint - Restrooms on Wall Panels

The blue 6" ceramic tile glaze associated with the pool perimeter walls and the beige 4" ceramic tile glaze found on restroom walls were found not to contain lead above the analysis method detection limit.

Introduction

This report presents results of an asbestos and lead survey performed by Entek which included select interior and exterior areas of the pools, surrounding deck and diving boards, the pool equipment and pump room, and several adjacent restrooms of John F Kennedy High School located at 6715 Gloria Drive in Sacramento, CA 95831.

The inspection was conducted by Mr. Blake Howes on May 3, 2024. Mr. Howes is a Cal/OSHA Certified Asbestos Consultant (CAC) and a State of California Department of Public Health (CDPH) certified Lead Inspector/Assessor.

This report was prepared for Mr. Chris Ralston, Director III of the Facilities Management, Maintenance & Operations, and Resource Management department for the SCUSD.

Building Description

This survey was specific to interior and exterior areas of the JFK High School campus as designated on the plans provided to Entek. The pool area is a standard concrete surfaced site with two swimming pools. The pools are have a hard surface coating at all walls and blue glazed ceramic tile at the perimeter. One pool has several diving boards on large metal columns. The pool surround is concrete with various sealants and rounded edge brick immediately surrounding the pools.

The pool equipment and pump room contains various pipe, tank, and boiler systems serving the pools. Most pipe is jacketed in asbestos containing friable insulating material. Several water tanks are present and jacketed in asbestos containing friable insulating material as well. The boiler unit has asbestos containing gasket material and may have other asbestos containing materials located in the interior. No access to the interior of the boiler was gained during this survey. The room itself has a concrete floor with a sump type pit in one corner. Drywall walls are present on the west, east, and south sides of the room. The north side of the room has walls constructed of some type of hard sound insulator board. The ceiling is a metal panel system in a large metal framed grid. Above ceiling spaces have metal roof trusses, fiberglass insulation, and fiberglass insulated pipes.

The restrooms around the pool area are all of similar construction with 2" ceramic floor tile, 4" ceramic wall tile, and some type of painted wall panel system above the tile.

Asbestos Inspection and Sample Collection Protocols

Entek included specific interior areas of the buildings included in this report, but used only limited methods to look within enclosed ceiling cavities during this investigation. Entek did include all suspect materials observed in, on, or associated with the areas included in this report.

Bulk samples were collected of various materials suspected to contain asbestos by utilizing a power drill and coring tube, cutting the materials with a razor knife, or use of other appropriate hand tools.

Thermal system insulation (TSI) materials were collected in a randomly distributed manner from each homogenous area that was not assumed to be ACM as required in 40 CFR Part 763, Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Miscellaneous materials were collected from each homogenous area in a manner sufficient to determine whether the material is or is not ACM as required in 40 CFR Part 763,

Asbestos-Containing Materials in Schools; Final Rule and Notice, published October 30, 1987.

Approximate locations of all samples collected during this inspection are indicated on the "Bulk Asbestos Material Analysis Request Form for Entek", which served as the chain of custody for the samples, and on the building diagrams attached to this report.

Asbestos Bulk Sample Results

There were several materials observed which are considered "suspect" under US EPA guidelines. Under current US EPA guidelines for conducting building inspections for ACM, all "suspect" materials must be assumed to contain asbestos until otherwise determined by laboratory testing.

The samples of materials suspected of containing asbestos were submitted to Asbestech, a laboratory located in Rancho Cordova, California. These samples were subsequently analyzed by polarized light microscopy (PLM) with dispersion staining.

The US EPA NESHAP and SMAQMD uses the terms Regulated Asbestos Containing Material (RACM), Category I, and Category II when identifying materials which contain asbestos in amounts greater than 1%. Cal/OSHA uses the term ACCM which indicates a manufactured construction material contains greater than 0.1% asbestos by weight by the PLM method. This definition can be found in Title 8, 1529.

All samples found to contain <1% asbestos by PLM analysis which are not identified as containing >1% asbestos, classified as RACM, CAT-I, or CAT-II materials in the following results tables were additionally analyzed using the 400 point count (PC) method with analysis by PLM. This additional analysis is required by NESHAP and enforced by SMAQMD. The PC method analysis results were used only to verify a material did not contain >1% asbestos as a single layer material, or as a composite result which is provided for materials such as sheet rock/drywall and joint compound used for wall/ceiling systems. A result reported as none detected or "trace" by the PC method only verified the initial PLM result of <1% and shall not be used to determine the identified material does not contain asbestos. Copies of Asbestech's laboratory reports and accreditations are attached.

Neither OSHA or Cal/OSHA allow for composite sampling of wall system materials, and neither address the use of the PC method to confirm a material identified as containing <1% asbestos by the PLM method either contains <1% asbestos or is non-detected for asbestos. As a result, reporting of the asbestos content related to a composited material such as sheet rock/drywall and joint compound does not apply to determining if a material is or is not an ACM by OSHA or an ACCM by Cal/OSHA.

A total of 29 bulk samples were collected of all the materials considered to be "suspect" which were observed during this investigation. Some of those samples contained multiple layers which were individually analyzed to determine their asbestos content. Analysis of all samples collected was by PLM with dispersion staining. Results of the analysis are listed in the following tables:

Suspect Materials Found or Assumed TO Contain Asbestos					
Sample ID#'s	**Suspect Material**	**Asbestos Content/Type (%) by PLM**	**Location**	**NESHAP Classification**	**Total Estimated Quantity**
01A	Large Water Tank Outside Insulation, Gray Wrap	**1-5% CHRYSOTILE** **5-10% AMOSITE** (Insulation) NONE DETECTED (Gray Wrap)	Pool Equipment Room - Large Tank	RACM	300 Sq.
02A	Small Water Tanks Outside Insulation, Gray Wrap	**10-15% AMOSITE** NONE DETECTED (Gray Wrap)	Pool Equipment Room - Small Tank & Small Tank Above Boiler	RACM	40 Sq.
03A	8" Outer Diameter Pipe Insulation, Gray Wrap	**10-15% AMOSITE** NONE DETECTED (Gray Wrap)	Pool Equipment Room - Throughout	RACM	110 Ln.
04A	4-6" Outer Diameter Pipe Insulation, Gray Wrap	**5-10% AMOSITE** NONE DETECTED (Gray Wrap)	Pool Equipment Room - Throughout	RACM	210 Ln.
05A-B	Boiler Unit Gasket Material	**80-90% CHRYSOTILE**	Pool Equipment Room - Boiler	CAT-I	5 Sq.
N/A	Boiler Unit Brick or Block Insulation	ASSUMED TO CONTAIN ASBESTOS	Pool Equipment Room - Boiler	RACM	Unknown if Present
07A-B	Drywall & Joint Compound	NONE DETECTED (Drywall) **<1% CHRYSOTILE** (Joint Compound) **<1% CHRYSOTILE** (Composite)*	Pool Equipment Room - South, East, and West Walls *Confirmed by 400 Point Count	ACCM	1,000 Sq.

NOTE: Any Category I or Category II materials identified in the previous tables which will be subjected to mechanical removal, must be considered RACM for the purposes of notification to US EPA Region IX and SMAQMD and classification of waste. Removal of any Category I or Category II materials prior to demolition of a building is dependent upon how the materials will be impacted and if the impact will cause the materials to become friable. If any remaining Category I or Category II materials will become friable they must be removed prior to the initiation of demolition.

NOTE: Cal/OSHA regulates all materials containing greater than 0.1% asbestos. As a result, impact to materials identified as ACCM and ACM must be performed by properly asbestos trained personnel utilizing appropriate personal protection, work practices, as well as, properly constructed and demarcated work areas or containments, in accordance with Cal/OSHA asbestos regulations.

Suspect Materials Found NOT TO Contain Asbestos or Considered Non-Suspect				
Sample ID#'s	**Suspect Material**	**EPA AHERA "Suspected" ACBM**	**Asbestos Content**	**Location**
06A-B	Slab Concrete	Miscellaneous	NONE DETECTED	Pool Equipment Room
08A-B	Cementitious/Acoustical Wallboard Material	Miscellaneous	NONE DETECTED	Pool Equipment Room - North Wall
09A-C	Brown/Black Fiberglass Pipe Insulation Outer Wrap, Silver Foil	TSI	NONE DETECTED	Pool Equipment Room - Above Ceiling Space
10A-B	Pool Deck Concrete	Miscellaneous	NONE DETECTED	Pool Area Surround
11A-B	Pool Deck Concrete Gray Sealant	Miscellaneous	NONE DETECTED	Pool Area Surround
12A-B	Pool Edge Rounded Brick & Mortar	Miscellaneous	NONE DETECTED	Pool Area Surround
13A-B	Pool Lining Material	Miscellaneous	NONE DETECTED	Pools
14A	Blue 6" Ceramic Tile, White Grout	Miscellaneous	NONE DETECTED	Pools at Perimeter Edge
15A	Black 2" Ceramic Tile, Black Grout	Miscellaneous	NONE DETECTED	Pools at Lane Markers
16A-B	Gray 6" Ceramic Floor Tile, Gray Grout	Miscellaneous	NONE DETECTED	Restrooms Near Pools
17A-B	Beige 4" Ceramic Wall Tile, White Grout	Miscellaneous	NONE DETECTED	Restrooms Near Pools

All sample number noted in the tables above start with ECG-24-7160-

The tables above provide an estimate of the amount of materials in square feet (Sq.) or linear feet (Ln.). Contractors are responsible for quantifying the exact quantity of materials impacted by the renovation or demolition and shall not rely on the quantities in the above tables.

US EPA AHERA uses three terms when determining the classification of a material for the purpose of sampling. These terms include miscellaneous, surfacing, and thermal system insulation (TSI).

Miscellaneous materials are building materials on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or TSI.

Surfacing materials are materials that are sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceiling and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

TSI is material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain, water condensation, or for other purposes.

The information provided in the tables of this report are for use by the Owner in determining where asbestos containing materials are located, and whether or not any future work may impact those materials. The information is also provided for use by any contractor who may perform work in areas impacting the materials listed in this report, and for use as appropriate by asbestos abatement contractors to provide costs related to work impacting ACM.

Any building materials which are considered "suspect" for containing asbestos which have not been identified in this report must be assumed to contain asbestos in amounts >1% until properly investigated and/or tested.

Materials commonly excluded from being suspected for containing asbestos include, but are not limited to: unwrapped pink and yellow fiberglass insulating materials or products, foam insulation, bare concrete, wood, metal, plastic, or glass. All other types of building materials or coatings on the materials listed above are commonly listed as "suspect" and must be tested prior to impact by a Contractor. Work impacting these untested or newly discovered materials must cease until an investigation can be completed.

Asbestos Regulatory Requirements

US EPA

The property included in this survey report is located in Sacramento County. Sacramento Metropolitan Air Quality Management District (SMAQMD) has been given authority for enforcement of the NESHAP regulations by means of their own rules (Rule 902 Asbestos).

A demolition is the wrecking, taking out, or burning of any load supporting structural member. A renovation is everything else. Ten day written notification to the SMAQMD is required prior to the performance of any demolition project regardless of asbestos being present or not. This notification would also apply to any renovation project which involves the wrecking, taking out, or burning of any load bearing structural member during a renovation as well.

There is a sufficient amount of ACM present to require a 10 day notification to the SMAQMD be submitted prior to starting work which will impact materials identified as RACM or CAT-I and CAT-II materials if they are made friable through mechanical means of removal. If more than 160 square feet, 260 linear feet or 35 cubic feet of RACM is planned for removal on the project, formal written notification to SMAQMD is required.

Cal/OSHA

Disturbance of any ACM or ACCM could generate airborne asbestos fibers and would be regulated by Cal/OSHA. Cal/OSHA worker health and safety regulations apply during any disturbance of ACM or ACCM by a person while in the employ of another. This is true regardless of friability or quantity disturbed.

If more than 100 square feet of ACCM or ACM will be impacted during the upcoming project, a licensed asbestos contractor, certified by the State of California, and registered with Cal/OSHA is required to perform the asbestos related removal work. Entek recommends a licensed asbestos contractor be used to remove ACM or ACCM even if less than 100 square feet of ACM or ACCM is being disturbed.

For compliance with Title 8, Section 341.9, the contractor must send written notice at least one day (24 hours) prior to start of any work which will impact any amount of asbestos to the local office for the State of California, Department of Occupational Safety and Health, and perform all work in accordance with Cal/OSHA requirements.

Lead Inspection, Sampling, & Results

A total of 11 bulk samples of the painted surfaces and glazed ceramic tiles from various locations throughout the project area were collected and submitted to MicroTest Laboratories. These samples were subsequently analyzed by atomic absorption spectrometry (AAS). Results of the analysis are listed in the following tables:

Paints/Coatings/ Materials Determined to be Lead Based Paint (LBP)		
Paint/Coating Color or Material	**Lead Content**	**Component/Location**
Beige Colored Paint	5,143 ppm	Drywall Walls - Pool Equipment Room
Green Colored Paint	17,853 ppm	Metal Support Poles - Pool Equipment Room
Red Colored Paint	80,231 ppm	Metal Hand Rails - Pool Equipment Room

LBP - Materials/coatings/paints meeting the definition of lead-based paint as defined by the CDPH and the US EPA, currently defined as containing lead in concentrations equal to or greater than 1.0 mg/cm^2, 5,000 ppm, or 0.5% by weight.

Paints/Coatings/ Materials Determined to be Lead Containing Paint (LCP)		
Paint/Coating Color or Material	**Lead Content**	**Component/Location**
Beige Colored Paint	930.3 ppm	Metal Ceiling Panels - Pool Equipment Room
Gray Colored Paint	551.2 ppm	Metal Roof Trusses - Pool Equipment Room
Gray Colored Paint	146.7 ppm	Metal Boiler Unit - Pool Equipment Room
Light Blue Colored Paint	3,440 ppm	Metal Pipes - Pool Equipment Room
Gray Colored Paint	804.7 ppm	Metal Support Column - Diving Pool at Diving Board
Beige Colored Paint	4,443 ppm	Wall Panels - Restrooms Surrounding Pool Area

LCP - Materials/coatings/paints which contain measurable amounts of lead. The disturbance of these materials/coatings/paints is regulated by Cal/OSHA.

Paints/Coatings/Materials Determined NOT TO Contain Lead	
Paint/Coating Color or Material	**Building Component**
Blue 6" Ceramic Tile Glaze	Pools at Perimeter Walls
Beige 4" Ceramic Tile Glaze	Restrooms Surrounding Pool Area on Wall Tiles

Paints determined “NOT TO” contain lead for the purposes of this report are those samples which when analyzed did not indicate lead to be present at or above the limit of detection for the analysis method used. This limit of detection was 100 parts per million (ppm). As a result, any paints shown “NOT TO” contain lead will not require any special training or work practices related to lead when impacted.

Lead Regulatory Compliance

Any upcoming project which may result in the disturbance of lead containing products or surfaces, but is not intended to remediate a lead hazard or specifically designed to remove LBP to reduce or eliminate a known hazard, would be considered “lead related construction work”.

Lead related construction work does not fit the classification of a “lead abatement project” under CDPH Title 17 regulations. “*Abatement*” is defined in Title 17, Division 1, Chapter 8, Article 1 as “any set of measures designed to reduce or eliminate lead hazards or LBP for public and residential buildings, but does not include containment or cleaning.” A *lead hazard* is defined in Title 17, Division 1, Chapter 8, Article 1 as “deteriorated LBP, lead contaminated dust, lead contaminated soil, disturbing LBP or presumed LBP without containment, or any other nuisance which may result in persistent and quantifiable lead exposure.”

Lead related construction work means any “construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of any residential or public building, including preparation and cleanup, that, by using or disturbing lead-containing material or soil, may result in significant exposure of adults or children to lead”. (Title 17, California Code of Regulations, Division 1, Chapter 8, Article 1).

Currently, Cal/OSHA has not established a definition for LBP, nor have they established minimum concentrations where their regulations do not apply. Cal/OSHA regulates all construction activities involving materials containing lead, including LBP. These regulations are found in CCR, Title 8 Section 1532.1 (§1532.1) Lead in Construction.

Since Cal/OSHA has not established a concentration of lead in a product where their regulations do not apply, any disturbance to products containing lead come under the jurisdiction of Cal/OSHA and their regulations. Disturbance of paints/coatings or materials determined to be LBP may trigger a pre-work notification to Cal/OSHA if “trigger tasks” disturb 100 square feet or more of those paints/coatings or materials. Trigger tasks are described in Title 8 CCR 1532.1.

Limitations

Entek inspected only the specific designated areas identified by the owner's representative to be included in the upcoming project, which did not include all interior and exterior areas of the buildings located at the campus. This survey is specific to the pools, surrounding deck and diving boards, the pool equipment and pump room, and several adjacent restrooms designated part of the upcoming project on plans provided to Entek.

As a result, the information provided in this inspection report may not be used to extend the inspection results to areas not included in this report without additional review and sampling as necessary.

If any new materials not listed as having been sampled, or listed as assumed for containing asbestos in this report are discovered, the new material must be assumed to contain asbestos until properly inspected and tested for asbestos content.

Entek's policy is to retain a full copy of these written documents for three (3) years once the file is closed. At the end of the 3 year period the written files will be destroyed without further notice. It is suggested copies of the file(s) are maintained as per the District's policy.

Entek will be providing only this electronic copy of the report and its attachments for your use. However, if you would like a hard copy of this report please do not hesitate to ask. Entek will be happy to mail the report upon receipt of your request.

Thank you for choosing Entek for your environmental needs. Please call me at (916) 632-6800 if you have any questions regarding this report.

Prepared by: 

Blake Howes
Vice President
Cal/OSHA CAC #13-5015
CDPH I/A Certification #3315

Appendices

A. Asbestos Related Documents
B. Lead Related Documents
C. Backup Documentation

C:\Users\bhowes\Entek Consulting Group, Inc\Entekgroup - Documents\Clients\Sacramento City USD\24-7160 JFK HS, Pool - AsbPb\Project Letters & Reports\Final Haz Mat Insp Rprt JFK Pool 5-15-24.wpd

APPENDIX A

ASBESTOS RELATED DOCUMENTS

- PLM Bulk Sample Analysis Reports From Asbestech
- PLM Bulk Sample Analysis Request Forms for Entek
- Sample Location Drawings
- SMAQMD Survey Form
- SMAQMD Renovation/Demolition Notification Form

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
24-7160 Sacramento City USD
John F Kennedy High School, 6715 Gloria Dr.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 71154-1
Date/Time Collected: 5/3/24
Date Received: 5/3/24

NVLAP Lab Code 101442-0
Date Analyzed: 5/6/24

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-24-7160-01A	White large water tank outside insulation, pool equipment room	1-5 CHRYSOTILE 5-10 AMOSITE	Gypsum
	Gray wrap	NONE DETECTED	Cellulose
02A	White small water tank outside insulation, pool equipment room	10-15 AMOSITE	Calcite
	Gray wrap	NONE DETECTED	Cellulose
03A	White 8” OD pipe insulation, pool equipment room	10-15 AMOSITE	Gypsum
	Gray wrap	NONE DETECTED	Cellulose
04A	White 4-6” OD pipe insulation, pool equipment room	5-10 AMOSITE	Calcite
	Gray wrap	NONE DETECTED	Cellulose
05A	Gray boiler unit gasket, pool equipment room	NONE DETECTED	Fibrous Glass
05B	Black/silver boiler unit gasket, pool equipment room	80-90 CHRYSOTILE	Tar Binder Opaques
06A	Gray slab concrete , pool equipment room	NONE DETECTED	Granular Mins.

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
24-7160 Sacramento City USD
John F Kennedy High School, 6715 Gloria Dr.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 71154-2
Date/Time Collected: 5/3/24
Date Received: 5/3/24

NVLAP Lab Code 101442-0
Date Analyzed: 5/6/24

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-24-7160-06B	Gray slab concrete , pool equipment room	NONE DETECTED	Granular Mins.
07A	White drywall, pool equipment room south wall	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
07B	White drywall, pool equipment room south wall	NONE DETECTED	Gypsum Fibrous Glass
	White joint compound	<1 CHRYSOTILE	Calcite
	Composite	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
08A	Gray cementitious/acoustical wallboard material, pool equipment room north wall	NONE DETECTED	Calcite
	White wallboard	NONE DETECTED	Calcite Fibrous Glass
08B	Gray cementitious/acoustical wallboard material, pool equipment room north wall	NONE DETECTED	Calcite
	White wallboard	NONE DETECTED	Calcite Fibrous Glass

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
24-7160 Sacramento City USD
John F Kennedy High School, 6715 Gloria Dr.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 71154-3
Date/Time Collected: 5/3/24
Date Received: 5/3/24

NVLAP Lab Code 101442-0
Date Analyzed: 5/6/24

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-24-7160-09A	Brown/black fiberglass pipe insulation outer wrap, pool equipment room above ceiling space on 4-6" OD pipes	NONE DETECTED	Tar Binder Cellulose
	Silver foil	NONE DETECTED	Opaques
09B	Brown/black fiberglass pipe insulation outer wrap, pool equipment room above ceiling space on 4-6" OD pipes	NONE DETECTED	Tar Binder Cellulose
	Silver foil	NONE DETECTED	Opaques
09C	Brown/black fiberglass pipe insulation outer wrap, pool equipment room above ceiling space on 4-6" OD pipes	NONE DETECTED	Tar Binder Cellulose
	Silver foil	NONE DETECTED	Opaques
10A	Gray pool deck concrete , pool area	NONE DETECTED	Granular Mins.
10B	Gray pool deck concrete , pool area	NONE DETECTED	Granular Mins.
11A	Gray pool deck concrete sealant , pool area	NONE DETECTED	Calcite
11B	Gray pool deck concrete sealant , pool area	NONE DETECTED	Calcite
12A	White pool edge rounded brick & mortar, pool area	NONE DETECTED	Granular Mins.

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
24-7160 Sacramento City USD
John F Kennedy High School, 6715 Gloria Dr.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 71154-4
Date/Time Collected: 5/3/24
Date Received: 5/3/24

NVLAP Lab Code 101442-0
Date Analyzed: 5/6/24

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-24-7160-12B	White pool edge rounded brick & mortar, pool area	NONE DETECTED	Granular Mins.
13A	White pool deck lining material, pool area	NONE DETECTED	Calcite
13B	White pool deck lining material, pool area	NONE DETECTED	Calcite
14A	Blue 6” ceramic tile, pool perimeter wall	NONE DETECTED	Granular Mins.
	White grout	NONE DETECTED	Calcite
15A	Black 2” ceramic tile, pool swim lane marker tile	NONE DETECTED	Granular Mins.
	Black grout	NONE DETECTED	Pumice
16A	Gray 6” ceramic floor tile, boy’s locker room NW exterior restroom	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.
16B	Gray 6” ceramic floor tile, boy’s locker room NW exterior restroom	NONE DETECTED	Granular Mins.
	Gray grout	NONE DETECTED	Granular Mins.

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
24-7160 Sacramento City USD
John F Kennedy High School, 6715 Gloria Dr.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 71154-5
Date/Time Collected: 5/3/24
Date Received: 5/3/24

NVLAP Lab Code 101442-0
Date Analyzed: 5/6/24

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-24-7160-17A	Beige 4" ceramic wall tile, boy's locker room NW exterior restroom	NONE DETECTED	Granular Mins.
	White grout	NONE DETECTED	Calcite
17B	Beige 4" ceramic wall tile, boy's locker room NW exterior restroom	NONE DETECTED	Granular Mins.
	White grout	NONE DETECTED	Calcite

THE ANALYSIS USES POLARIZED LIGHT MICROSCOPY AND DISPERSION STAINING FOLLOWING E.P.A. METHOD 600/R-93/116. NON-FRIABLE MATERIALS WERE ANALYZED APPLYING THE SAME METHOD. THE LOWER DETECTION LIMIT IS <1 % WITH THE PROVISO THAT PLM MAY NOT DETECT FIBERS <0.25 MICRONS IN DIAMETER THAT MAY BE PRESENT IN SAMPLES SUCH AS FLOOR TILES. IN ACCORDANCE WITH TITLE 22, CCR, SECTION 66261.24(a)(2)(A),THE MCL IS 1 %. SAMPLES WERE NOT COLLECTED BY ASBESTECH. THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE APPROVAL OF ASBESTECH. THIS REPORT RELATES ONLY TO THE ITEMS TESTED. THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY N.V.L.A.P. OR ANY AGENCY OF THE U.S. GOVERNMENT. ASBESTECH ACCEPTS TECHNICAL RESPONSIBILITY FOR THIS REPORT AND DATE OF ISSUE.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES 

ENTEK

400 Point Count Confirmation Analysis Results
(Confirmation of <1% Asbestos Content)

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, California 95670
Tel.(916) 481-8902 asbestech@sbcglobal.net

Client:
Entek Consulting Group, Inc.
4200 Rocklin Rd., Suite 7
Rocklin, CA 95677

Job:
24-7160 Sacramento City USD
John F Kennedy High School, 6715 Gloria Dr.
Sacramento, Ca

BULK ASBESTOS ANALYSIS REPORT

LAB JOB # 71170
Date/Time Collected: 5/3/24
Date Received: 5/3/24

NVLAP Lab Code 101442-0
Date Analyzed: 5/8/24

Sample No.	*Color/Description*	*% Type Asbestos*	*Other Materials*
ECG-24-7160-07A	White drywall/joint compound composite , pool equipment room south wall	<1 CHRYSOTILE	Gypsum Fibrous Glass Calcite
07B	White drywall/joint compound composite , pool equipment room south wall	TRACE CHRYSOTILE	Gypsum Fibrous Glass Calcite

NOTE: These samples were analyzed by quantitative Point Counting using a Chalkley Point Array over 400 non-empty points.

NVLAP LAB CODE 101442-0 LAB DIRECTOR: TOM CONLON ANALYST: JIM JUNGLES Jim Jungles

71154

ENTEK

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: May 3, 2024

Job Number: 24-7160

Client Name: Sacramento City Unified School District

Site Address: John F Kennedy High School
6715 Gloria Drive
Sacramento, CA 95831

Lab: Asbestech

Collected by: Blake Howes

Turnaround Time: Tuesday, 5-7-24 by 5:00 pm

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: *Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-24-7160-01A	Large Water Tank Outside Wrap Insulation - Pool Equipment Room
ECG-24-7160-02A	Small Water Tank Outside Wrap Insulation - Pool Equipment Room
ECG-24-7160-03A	8" Outer Diameter Pipe Insulation Wrap - Pool Equipment Room
ECG-24-7160-04A	4-6" Outer Diameter Pipe Insulation Wrap - Pool Equipment Room
ECG-24-7160-05A	Boiler Unit Gasket - Pool Equipment Room
ECG-24-7160-05B	Boiler Unit Gasket - Pool Equipment Room
ECG-24-7160-06A	Slab Concrete - Pool Equipment Room
ECG-24-7160-06B	Slab Concrete - Pool Equipment Room
ECG-24-7160-07A	Drywall & Joint Compound - Pool Equipment Room South Wall
ECG-24-7160-07B	Drywall & Joint Compound - Pool Equipment Room South Wall
ECG-24-7160-08A	Cementitious/Acoustical Wallboard Material & Joint Compound - Pool Equipment Room North Wall
ECG-24-7160-08B	Cementitious/Acoustical Wallboard Material & Joint Compound - Pool Equipment Room North Wall
ECG-24-7160-09A	Fiberglass Pipe Insulation Outer Wrap - Pool Equipment Room Above Ceiling Space on 4-6" Outer Diameter Pipes

Delivered by: _____ **Date:** 5/3/24 **Time:** 11:17 **AM/PM**

Received by: _____ **Date:** 5/3/24 **Time:** 1117 **AM/PM**

7154

ENTEK

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: May 3, 2024

Job Number: 24-7160

Client Name: Sacramento City Unified School District

Site Address: John F Kennedy High School
6715 Gloria Drive
Sacramento, CA 95831

Lab: Asbestech

Collected by: Blake Howes

Turnaround Time: Tuesday, 5-7-24 by 5:00 pm

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: *Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-24-7160-09B	Fiberglass Pipe Insulation Outer Wrap - Pool Equipment Room Above Ceiling Space on 4-6" Outer Diameter Pipes
ECG-24-7160-09C	Fiberglass Pipe Insulation Outer Wrap - Pool Equipment Room Above Ceiling Space on 4-6" Outer Diameter Pipes
ECG-24-7160-10A	Pool Deck Concrete - Pool Area
ECG-24-7160-10B	Pool Deck Concrete - Pool Area
ECG-24-7160-11A	Pool Deck Concrete Sealant - Pool Area
ECG-24-7160-11B	Pool Deck Concrete Sealant - Pool Area
ECG-24-7160-12A	Pool Edge Rounded Brick & Mortar - Pool Area
ECG-24-7160-12B	Pool Edge Rounded Brick & Mortar - Pool Area
ECG-24-7160-13A	Pool Lining Material - Pool Area
ECG-24-7160-13B	Pool Lining Material - Pool Area
ECG-24-7160-14A	Blue 6" Ceramic Tile & Grout - Pool Perimeter Wall
ECG-24-7160-15A	Black 2" Ceramic Tile & Grout - Pool Swim Lane Marker Tile
ECG-24-7160-16A	Gray 6" Ceramic Floor Tile & Grout - Boy's Locker Room Northwest Exterior Restroom

Delivered by: [signature] **Date:** 5/3/24 **Time:** 11:57 AM/PM

Received by: [signature] **Date:** 5/3/24 **Time:** 11:17 AM/PM

7/154

ENTEK

BULK ASBESTOS MATERIAL *Analysis Request*

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: May 3, 2024

Job Number: 24-7160

Client Name: Sacramento City Unified School District

Site Address: John F Kennedy High School
6715 Gloria Drive
Sacramento, CA 95831

Lab: Asbestech

Collected by: Blake Howes

Turnaround Time: Tuesday, 5-7-24 by 5:00 pm

ANALYSIS REQUESTED: Asbestos by PLM with Dispersion Staining

Special Instruction: *Stop Analysis upon first positive result (>1%) for sample in a series. Also stop analysis upon first positive result (>1%) in the joint compound for sample series.*

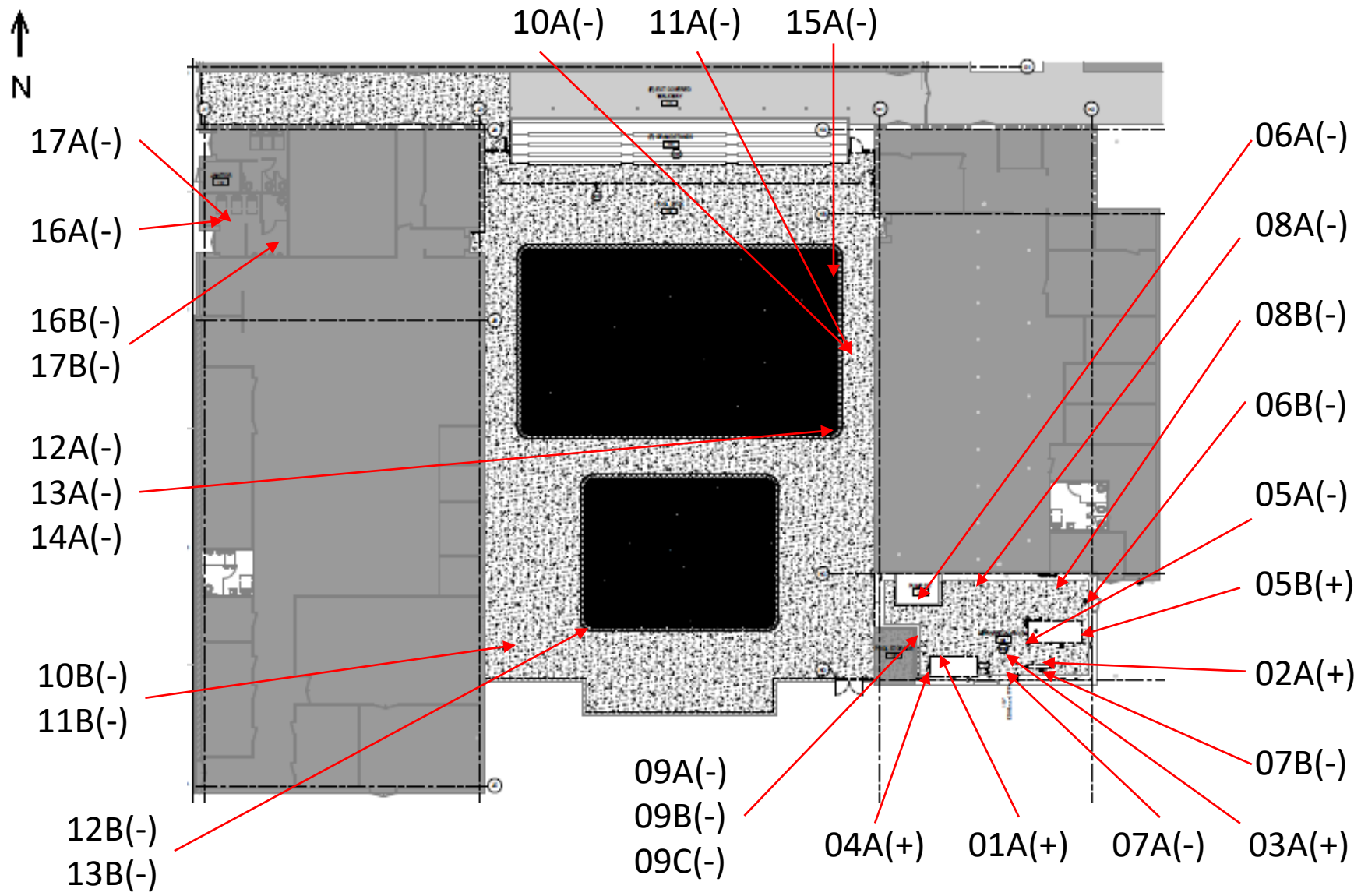
Please e-mail results at mainoffice@entekgroup.com as soon as available and include copy of submittal with those results.

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-24-7160-16B	Gray 6" Ceramic Floor Tile & Grout - Boy's Locker Room Northwest Exterior Restroom
ECG-24-7160-17A	Beige 4" Ceramic Wall Tile & Grout - Boy's Locker Room Northwest Exterior Restroom
ECG-24-7160-17B	Beige 4" Ceramic Wall Tile & Grout - Boy's Locker Room Northwest Exterior Restroom

C:\Users\bhowes\Entek Consulting Group, Inc\Entekgroup - Documents\Clients\Sacramento City USD\24-7160 JFK HS, Pool - AsbPb\Bulk Asb\Bulk Request 05-03-24.wpd

Delivered by: _____ **Date:** 5/3/24 **Time:** 11:57 **AM/PM**

Received by: _____ **Date:** 5/3/24 **Time:** 1117 **AM/PM**



Sacramento City Unified School District John F Kennedy High School 6715 Gloria Drive Sacramento, CA 95834	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Asbestos Bulk Sample Locations Collected by Blake Howes On May 3, 2024 Project Number 24-7160

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Asbestos Survey Form

(See Instructions)

777 12th Street, 3rd Floor
Sacramento, CA 95814
Office (916) 874-4800
Fax (916) 874-4899
Email:
asbestos@airquaility.org

1. Purpose of Survey	X	Renovation		Demolition

2. Facility Information

Project Area(s) Description	John F Kennedy High School - Pool Upgrade Project		
Address: 6715 Gloria Drive		City: Sacramento	# of Structures: 1

3. Owner Information

Name	Sacramento City Unified School District		
Address: 425 1st Avenue		City/State: Sacramento, CA	Zip: 95818

Contact	Phone	Fax	Email
Mr. Chris Ralston	916-643-2464		chris-ralston@scusd.edu

4. Consultant Information — **Survey Date(s): May 3, 2024**

Company Name: Entek Consulting Group, Inc.		
Name: Blake Howes		DOSH #: 13-5015
Address: 4200 Rocklin Road, Suite 7	City/State: Rocklin, California	Zip: 95677

Phone	Fax	Email	Signature
(916) 632-6800	(916) 632-6812	bhowes@entekgroup.com	Blake Howes

5. Client Information (If different than owner) ☐ General Contractor ☐ Insurance Company ☐ Architect ☐ Property Manager ☐ Other _____

Name		
Address	City/State	Zip

Contact	Phone	Fax	Email

6. Have all of the suspect materials that will be disturbed been sampled? ■ Yes ☐ No

If no, explain why:

7. Summary of Total Asbestos Containing Material (ACM) Findings

Regulated Asbestos Containing Material (RACM) (Includes materials subject to known mechanical removal and fire damaged materials)			Category II		Category I	
Square Ft.	Linear Ft.	Cubic Ft.	Square Ft.	Linear Ft.	Square Ft.	Linear Ft.
340	320	0	0	0	5	0

To receive future SMAQMD Rule updates and changes affecting your industry (check one box):

☐ Please send e-mail notices to ☐ I will sign up myself at www.airquality.org/listserve/ to receive emailed notices.

■ I am already subscribed. ☐ I want the District to mail notices to the address on this application: ☐ Owner ☐ Consultant

C:\Users\bhowes\Entek Consulting Group, Inc\Entekgroup - Documents\Clients\Sacramento City USD\24-7160 JFK HS, Pool - AsbPb\SMAQMD Forms\SMAQMD Asbestos Survey Form 2019.wpd

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Asbestos Renovation/Demolition Notification Form

777 12th Street, 3rd Floor
Sacramento, CA 95814
Office (916) 874-4800
Fax (916) 874-4899
Asbestos@airquaility.org

1	Building Department Permit Application # (if known) : _____	■ ☐ ☐ ☐	Renovation (Do not complete Section 5) Demolition (Complete all sections) Ordered Demo - Attach ordered demo letter Emergency Demo - SMAQMD Emergency #._____

2	Contractor	Owner
	Address	Address
	City, State / Zip	City, State / Zip
	Email	Email
	Telephone	Telephone

3	Structure Name	Renovation Area	# of Floors
	Project Address	City / Zip	Year Built

4	Preference for return of form	☐ E-mail	☐ Other :

DEMOLITIONS ONLY - Start date must be at least 10 working days from the day of your postmark or hand delivery of this form.

5		Revision # 1 2 3 4 5 6 7 8 9 (circle)
	Start Date ____/____/____	New Start Date ____/____/____
	Completion Date ____/____/____	New Completion Date ____/____/____
	Method of Demo: (Check Applicable): ☐ Manual/Hand Tools ☐ Mechanical/Heavy Equipment ☐ Other	
	Procedure to be followed if RACM is found or Category II material becomes friable:	

I have read and understand the directions. The information on this form is true and accurate.
I certify that the asbestos survey conducted represents the facility as built.

6	Application Name (Print)	☐ ☐ ☐	Owner Rep / Agent Contractor	Permit may be issued on:
	Phone Number			
	Application Signature	Date		

Have DOSH Consultant complete and sign below OR attach completed Asbestos Survey Form and Consultant's report.

CONSULTANT USE ONLY

Company Name Entek Consulting Group, Inc.		Telephone (916) 632-6800	
Surveyor Name Blake Howes		DOSH # 13-5015	Survey Date 5-3-24
Analytical Method PLM by Dispersion Staining		Pt Count Materials <10% ■ Yes ☐ No ☐ Declined by Client	
Amount of RACM	Square Feet 340	Linear Feet 320	Cubic Feet 0
Amount of Category I 5		Amount of Category II 0	
Project Address 6715 Gloria Drive		City Sacramento	Zip 95838
Suspect Materials Present? ■ Yes ☐ No		Consultant's Signature Blake Howes	

SMAQMD USE ONLY

Date Received / Date Postmark _____ Date Approved & Returned _____

Project #_____ Check #_____ Receipt #_____ Amount Paid _____ Staff _____

APPENDIX B

LEAD RELATED DOCUMENTATION

- Bulk Lead Analysis Report From MicroTest
- Bulk Lead Material Analysis Request Form for Entek
- Lead Bulk Sample Location Drawings
- CDPH Form 8552

MicroTest Laboratories, Inc. | AIHA ELPAT #160934
3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
PH 916.567.9808 | FX 916.404.0302
www.microtestlabsinc.com | service@microtestlabsinc.com

****for office use only****

Project ID

L34809-19

CLIENT INFORMATION

Company Entek Consulting Group, Inc
Name Ryan Metzen
Address 4200 Rocklin Road, Suite 7
Rocklin, CA 95677
Phone 916.632.6800
Email mainoffice@entekgroup.com
rmetzen@entekgroup.com

SAMPLE

Date Friday, May 3, 2024
Time

MicroTest Laboratories

Analytical Report

JOB SITE INFORMATION

Sampler Blake Howes
Project Sacramento City Unified School District
Site John F Kennedy High School
Address 6715 Gloria Drive
Sacramento, CA 95831
Job # 24-7160
PO #

Lead in Paint/Bulk Analysis by Flame AA - EPA METHOD 7420/7000B

Client Sample ID	Laboratory Sample ID	Client Sample Description	Matrix	Results	Reporting Limits (RL)	Comments
ECG-24-7160-01Pb	L34809	Beige Colored Paint - Pool Equipment Room on Drywall Walls	Paint	0.51 % Wt	0.01 %Wt	
				5143 PPM	100 PPM	
ECG-24-7160-02Pb	L34810	Beige Colored Paint - Pool Equipment Room on Metal Ceiling Panels	Paint	0.09 % Wt	0.01 %Wt	
				930.3 PPM	100 PPM	
ECG-24-7160-03Pb	L34811	Gray Colored Paint - Pool Equipment Room on Metal Roof Trusses	Paint	0.06 % Wt	0.01 %Wt	
				551.2 PPM	100 PPM	
ECG-24-7160-04Pb	L34812	Gray Colored Paint - Pool Equipment Room on Boiler Unit	Paint	0.01 % Wt	0.01 %Wt	
				146.7 PPM	100 PPM	
ECG-24-7160-05Pb	L34813	Green Colored Paint - Pool Equipment Room on Metal Support Poles	Paint	1.79 % Wt	0.1 %Wt	
				17853 PPM	1000 PPM	
ECG-24-7160-06Pb	L34814	Light Blue Colored Paint - Pool Equipment Room on Metal Pipes	Paint	0.34 % Wt	0.01 %Wt	
				3440 PPM	100 PPM	
ECG-24-7160-07Pb	L34815	Red Colored Paint - Pool Equipment Room on Metal Hand Rails	Paint	8.02 % Wt	1 %Wt	
				80231 PPM	10000 PPM	
ECG-24-7160-08Pb	L34816	Blue 6" Ceramic Tile Glaze - Pool Area at Pool Perimeter Tile	Paint	<RL % Wt	0.01 %Wt	
				<RL PPM	100 PPM	
ECG-24-7160-09Pb	L34817	Gray Colored Paint - Pool Area at Metal Diving Board Support Columns	Paint	0.08 % Wt	0.01 %Wt	
				804.7 PPM	100 PPM	
ECG-24-7160-10Pb	L34818	Beige Colored Paint - Boy's Locker Room Northwest Exterior Restroom on Wall Panels	Paint	0.44 % Wt	0.01 %Wt	
				4443 PPM	100 PPM	

Date Received: Friday, May 3, 2024
Date Analyzed: Monday, May 6, 2024
Date Reported: Wednesday, May 15, 2024

Analyst: **Ry Jensen**

Authorized Signatory:
Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Mod.

MicroTest Laboratories, Inc. | AIHA ELPAT #160934
3110 Gold Canal Dr, Ste. A, Rancho Cordova, CA 95670
PH 916.567.9808 | FX 916.404.0302
www.microtestlabsinc.com | service@microtestlabsinc.com

****for office use only****

Project ID

L34809-19

CLIENT INFORMATION

Company	Entek Consulting Group, Inc
Name	Ryan Metzen
Address	4200 Rocklin Road, Suite 7 Rocklin, CA 95677
Phone	916.632.6800
Email	mainoffice@entekgroup.com

SAMPLE

Date	Friday, May 3, 2024
Time	

MicroTest Laboratories

Analytical Report

JOB SITE INFORMATION

Sampler	Blake Howes
Project	Sacramento City Unified School District
Site	John F Kennedy High School
Address	6715 Gloria Drive Sacramento, CA 95831
Job #	24-7160
PO #	

Lead in Paint/Bulk Analysis by Flame AA - EPA METHOD 7420/7000B

Client Sample ID	Laboratory Sample ID	Client Sample Description	Matrix	Results	Reporting Limits (RL)	Comments
ECG-24-7160-11Pb	L34819	Beige 4" Ceramic Tile Glaze - Boy's Locker Room Northwest Exterior Restroom on Wall Tile	Paint	<RL % Wt <RL PPM	0.01 %Wt 100 PPM	

Date Received:	Friday, May 3, 2024
Date Analyzed:	Monday, May 6, 2024
Date Reported:	Wednesday, May 15, 2024

Analyst: **Ry Jensen**

Authorized Signatory:

Kelly Favero - Lab Manager

This report applies to the standards and procedures indicated to the specific samples analyzed. Samples have NOT been corrected for blank values. EPA 3050B Mod.

ENTEK

BULK LEAD MATERIAL *Analysis Request*

Project ID: L34809-19
Client: Entek
Receipt Date: 05/03/24
Count: 11 **TAT:** 48 HR

ENTEK CONSULTING GROUP, INC.
4200 ROCKLIN ROAD, SUITE 7
ROCKLIN, CA 95677
(916) 632-6800 PHONE
(916) 632-6812 FAX
mainoffice@entekgroup.com

Date of Sampling: May 3, 2024

Job Number: 24-7160

Client Name: Sacramento City Unified School District

Site Address: John F Kennedy High School
6715 Gloria Drive
Sacramento, CA 95831

Lab: MicroTest Laboratories

Collected by: Blake Howes

Turnaround Time: 48 Hour

ANALYSIS REQUESTED: Lead by Flame Atomic Absorption Spectroscopy

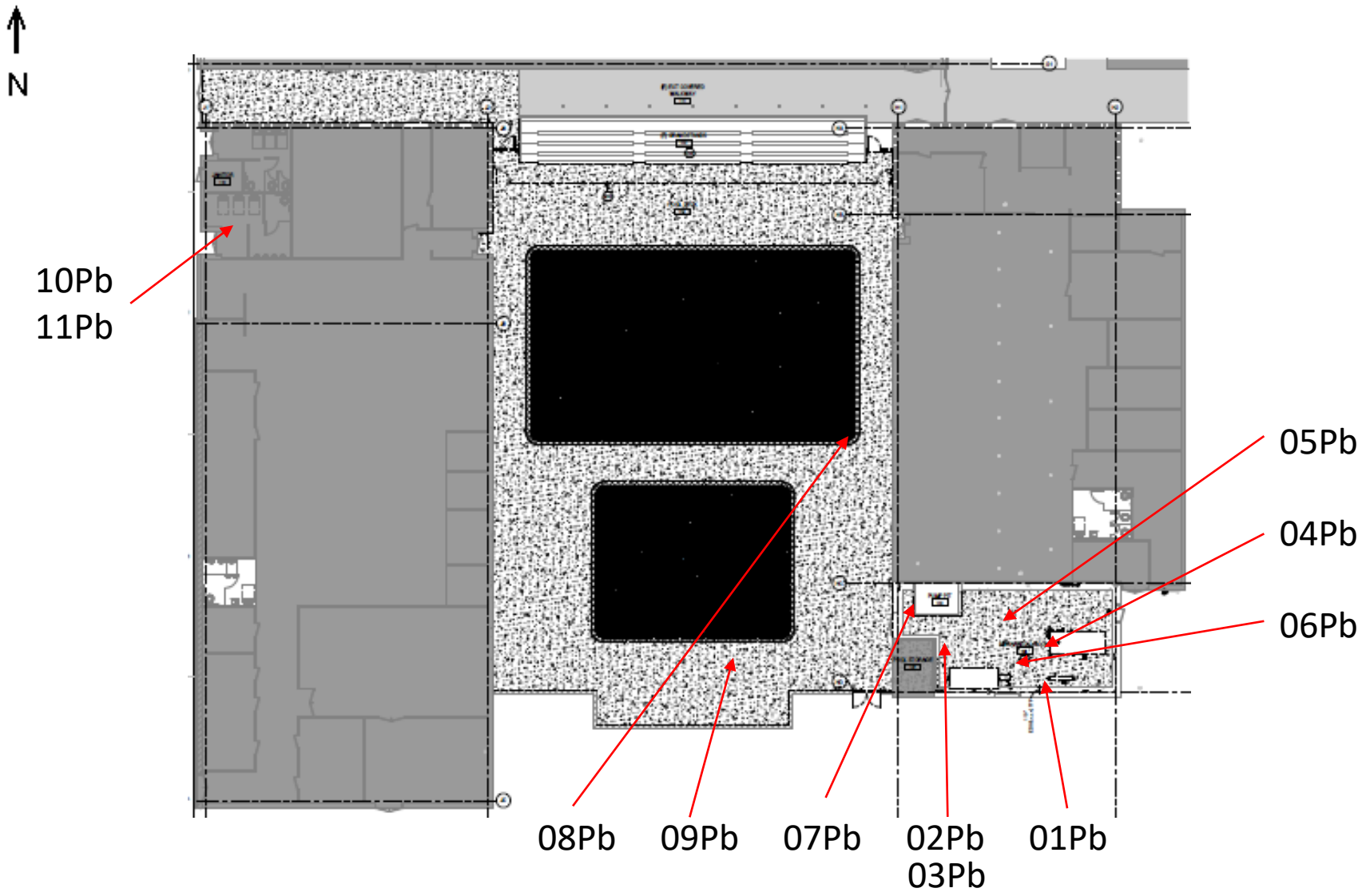
Special Instruction: *Please report result in PPM and % by weight. Please email results as soon as possible.*

SAMPLE #	MATERIAL DESCRIPTION/LOCATION
ECG-24-7160-01Pb	Beige Colored Paint - Pool Equipment Room on Drywall Walls
ECG-24-7160-02Pb	Beige Colored Paint - Pool Equipment Room on Metal Ceiling Panels
ECG-24-7160-03Pb	Gray Colored Paint - Pool Equipment Room on Metal Roof Trusses
ECG-24-7160-04Pb	Gray Colored Paint - Pool Equipment Room on Boiler Unit
ECG-24-7160-05Pb	Green Colored Paint - Pool Equipment Room on Metal Support Poles
ECG-24-7160-06Pb	Light Blue Colored Paint - Pool Equipment Room on Metal Pipes
ECG-24-7160-07Pb	Red Colored Paint - Pool Equipment Room on Metal Hand Rails
ECG-24-7160-08Pb	Blue 6" Ceramic Tile Glaze - Pool Area at Pool Perimeter Tile
ECG-24-7160-09Pb	Gray Colored Paint - Pool Area at Metal Diving Board Support Columns
ECG-24-7160-10Pb	Beige Colored Paint - Boy's Locker Room Northwest Exterior Restroom on Wall Panels
ECG-24-7160-11Pb	Beige 4" Ceramic Tile Glaze - Boy's Locker Room Northwest Exterior Restroom on Wall Tile

C:\Users\bhowes\Entek Consulting Group, Inc\Entekgroup - Documents\Clients\Sacramento City USD\24-7160 JFK HS, Pool - AsbPb\Bulk Pb\Bulk Request Pb 05-03-24.wpd

Delivered by: _____ **Date:** 5 / 3 / 24 **Time:** 11:20 AM/PM

Received by: _____ **Date:** 05 / 03 / 24 **Time:** 11:20 AM/PM



Sacramento City Unified School District John F Kennedy High School 6715 Gloria Drive Sacramento, CA 95834	Entek Consulting Group, Inc. 4200 Rocklin Road, Suite 7 Rocklin, CA 95677 Map Not to Scale	Lead Bulk Sample Locations Collected by Blake Howes On May 3, 2024 Project Number 24-7160

LEAD HAZARD EVALUATION REPORT

Section 1 – Date of Lead Hazard Evaluation May 3, 2024

Section 2 – Type of Lead Hazard Evaluation (Check one box only)

■ Lead Inspection ❒ Risk Assessment ❒ Clearance Inspection ❒ Other (specify) Limited Bulk Sampling per Cal/OSHA 1532.1

Section 3–Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
6715 Gloria Drive	Sacramento	Sacramento	95838

Construction date (year) of structure	Type of structure	Children living in structure?
1960s	❒ Multi-unit building ■ School or daycare ❒ Single family dwelling ❒ Other (specify)_____	❒ Yes ■ No ❒ Don't Know

Section 4–Owner of Structure (If business/agency, list contact person)

	Telephone Number
Sacramento City Unified School District - Mr. Chris Ralston	(916) 643-2464

Address [number, street, apartment (if applicable)]	City	State	Zip Code
425 1st Avenue	Sacramento	California	95818

Section 5–Results of Lead Hazard Evaluation (Check all that apply)

❒ No lead-based paint detected ■ Intact lead-based paint detected. ❒ Deteriorated lead-based paint detected

❒ No lead hazards detected ❒ Lead-contaminated dust found ❒ Lead contaminated soil found ❒ Other _____

Section 6–Individual Conducting Lead Hazard Evaluation

Name	Telephone Number
Entek Consulting Group, Inc. - Blake Howes	(916) 632-6800

Address [number, street, apartment (if applicable)]	City	State	Zip Code
4200 Rocklin Road, Suite 7	Rocklin	CA	95677

CDPH certification number	Signature	Date
3315	Blake Howes	5-15-24

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

Section 7–Attachments

A. A foundation diagram or sketch of the structure indicating the specific locations of each lead hazard or presence of lead-based paint;

B. Each testing method, device, and sampling procedure used;

C. All data collected, including quality control data, laboratory results, indicating laboratory name, address, and phone number.

First copy and attachments retained by inspector

Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:

California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

APPENDIX C

BACK UP DOCUMENTATION

- Photo Log
- Inspector Accreditations and Certifications
- Laboratory Accreditations for Asbestos and Lead Analysis

Photo Log

Job Number:	24-7160	Date:	May 3, 2024
Client:	Sacramento City Unified School District		
Site Address:	JFK High School – Pool Area – 6715 Gloria Drive, Sacramento 95831		

General Pool Area

General Pool Equipment Room

Photo Log

Job Number:	24-7160	Date:	May 3, 2024
Client:	Sacramento City Unified School District		
Site Address:	JFK High School – Pool Area – 6715 Gloria Drive, Sacramento 95831		

Large Water Tank

Boiler Unit

Photo Log

Job Number:	24-7160	Date:	May 3, 2024
Client:	Sacramento City Unified School District		
Site Address:	JFK High School – Pool Area – 6715 Gloria Drive, Sacramento 95831		

Small Tank

Pipe Insulation – Warning Labels Affixed

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Name **Blake W Howes**

Certification No. **13-5015**

Expires on **04/17/25**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

California Department of PublicHealth

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC HEALTH

LEAD-RELATED CONSTRUCTION CERTIFICATE

INDIVIDUAL:	CERTIFICATE TYPE:	NUMBER:	EXPIRATION DATE:
	Lead Inspector/Assessor	LRC-00003315	9/27/2024

Blake Howes

Disclaimer: This document alone should not be relied upon to confirm certification status. Compare the individual's photo and name to another valid form of government issued photo identification. Verify the individual's certification status by searching for Lead-Related Construction Professionals at www.cdph.ca.gov/programs/clppb or calling (800) 597-LEAD

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101442-0

ASBESTECH

Rancho Cordova, CA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2023-07-01 through 2024-06-30

Effective Dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Voluntary Laboratory Accreditation Program

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ASBESTECH
11151 Sun Center Drive, Suite B
Rancho Cordova, CA 95670
Mr. Tommy Conlon
Phone: 916-481-8902 Fax: 916-481-3975
Email: asbestech@sbcglobal.net
http://www.asbestechlab.com

ASBESTOS FIBER ANALYSIS **NVLAP LAB CODE 101442-0**

Bulk Asbestos Analysis

Code	*Description*
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

Code	*Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

For the National Voluntary Laboratory Accreditation Program

CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

CERTIFICATE OF ENVIRONMENTAL LABORATORY ACCREDITATION

Is hereby granted to

MicroTest Laboratories, Inc.

3110 Gold Canal Drive

Rancho Cordova, CA 95670

Scope of the certificate is limited to the
"Fields of Accreditation"
which accompany this Certificate.

Continued accredited status depends on compliance with applicable laws and regulations, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of
Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **2974**

Effective Date: **7/1/2022**

Expiration Date: **6/30/2024**

Sacramento, California
subject to forfeiture or revocation

Christine Sotelo, Program Manager
Environmental Laboratory Accreditation Program

CALIFORNIA STATE
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Fields of Accreditation

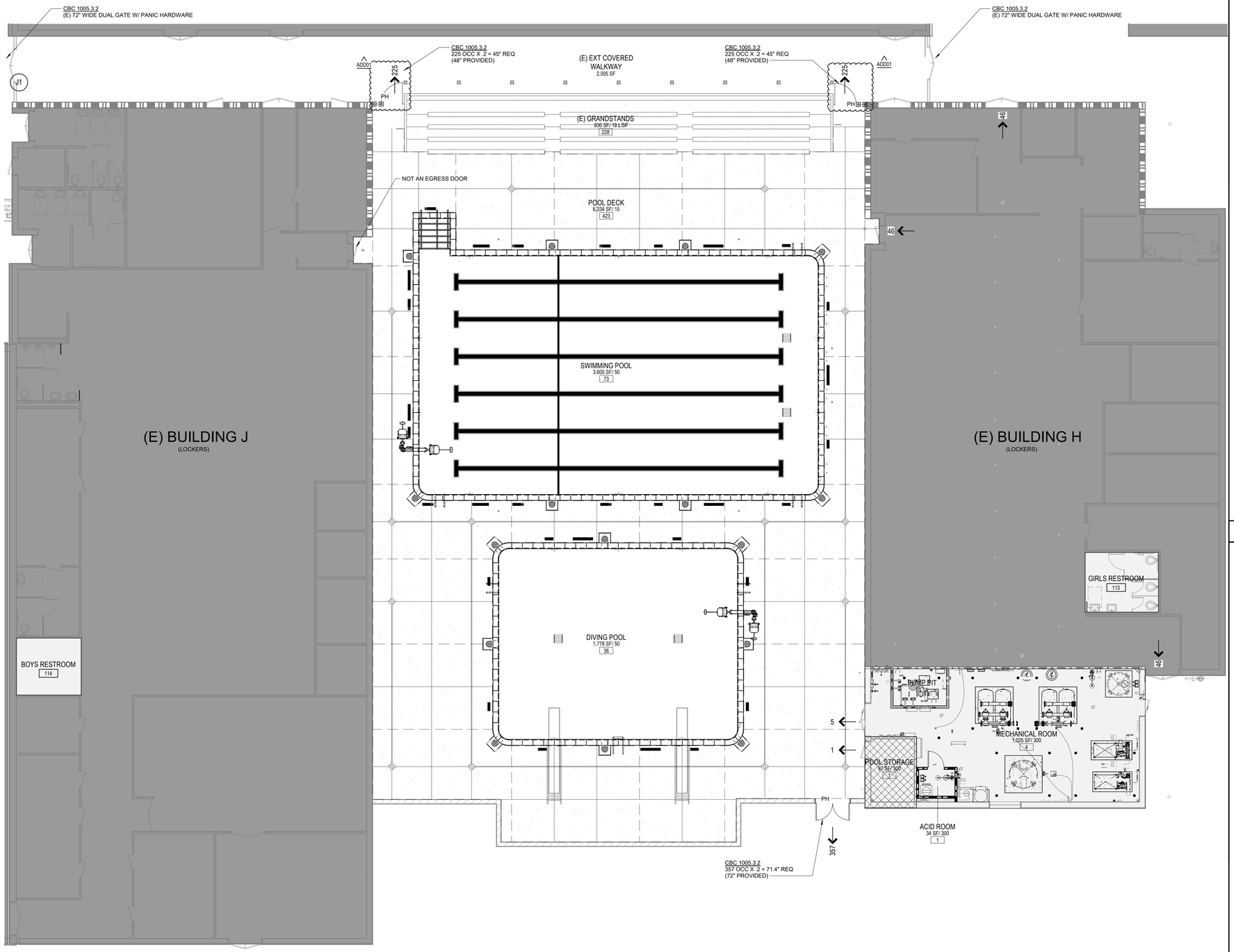
MicroTest Laboratories, Inc.

3110 Gold Canal Drive
Rancho Cordova, CA 95670
Phone: 9165679808

Certificate Number: 2974
Expiration Date: 6/30/2024

Field of Accreditation: 114 - Inorganic Constituents in Hazardous Waste			
114.345	002	Antimony	EPA 6020 B
114.345	003	Arsenic	EPA 6020 B
114.345	004	Barium	EPA 6020 B
114.345	005	Beryllium	EPA 6020 B
114.345	006	Cadmium	EPA 6020 B
114.345	008	Chromium	EPA 6020 B
114.345	009	Cobalt	EPA 6020 B
114.345	010	Copper	EPA 6020 B
114.345	012	Lead	EPA 6020 B
114.345	016	Nickel	EPA 6020 B
114.345	018	Selenium	EPA 6020 B
114.345	021	Thallium	EPA 6020 B
114.345	023	Zinc	EPA 6020 B
114.345	024	Molybdenum	EPA 6020 B
114.515	001	Lead	EPA 7420
114.545	001	Mercury	EPA 7471 B
Field of Accreditation: 115 - Leaching/Extraction Tests and Physical Characteristics of Hazardous Waste			
115.055	001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.085	001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311
Field of Accreditation: 121 - Bulk Asbestos Analysis of Hazardous Waste			
121.010	001	Bulk Asbestos	EPA 600/M4-82-020

As of 7/1/2022 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.



1 LIFE SAFETY FLOOR PLAN - POOL

SCALE 1/8" = 1'-0"

EXISTING POOL AREA ANALYSIS

1. GOVERNING CODE: 2022 CALIFORNIA BUILDING CODE
2. OCCUPANCY TYPE: (CBC CHAPTER 3) EXISTING GROUP E OCCUPANCY (BUILDING H & J)
   EXISTING GROUP A-5 OCCUPANCY (EXTERIOR POOL AREA)
3. (E) CONSTRUCTION TYPE: (CBC CHAPTER 6)

BUILDING H	TYPE V-A (NON-SPRINKLERED)
BUILDING J	TYPE V-A (NON-SPRINKLERED)
POOL	N/A

NOTE: (E) SPRINKLERS EXISTS ONLY AT BUILDING H MECHANICAL ROOM

4. (E) BUILDING AREA:

	GROUP E	GROUP A-5	GROUP S
BUILDING H	9,069 SF		1,380 SF
BUILDING J	8,270 SF		
POOL		11,654 SF	

5. (E) BUILDING HEIGHT:

BUILDING H	17'-10"
BUILDING J	17'-5"
POOL	N/A

6. (E) OCCUPANT LOAD: (CBC CHAPTER 10)

BUILDING H	6,872 SF/ 50 = 138 OCCUPANTS 1,398 SF/ 300 = 5 OCCUPANTS (MECH + POOL STORAGE)
BUILDING J	NONE, BUILDING J DOES NOT EGRESS ONTO POOL
POOL	761 OCCUPANTS

NOTE: SCOPE OF WORK DOES NOT CHANGE EXISTING SF, OCCUPANCY LOAD, AND OCCUPANCY GROUP

LEGEND

Name — ROOM USE
150 SF/ 20 — SQUARE FOOTAGE / OCCUPANT FACTOR
7 — OCCUPANT LOAD

→ 0 — EXIT AND NUMBER OF OCCUPANTS USING EXIT

0 ▶ — EXIT ACCESS AND NUMBER OF OCCUPANTS USING EXIT ACCESS

(E) A-5 OCCUPANCY WITH SCOPE OF WORK

(E) S OCCUPANCY WITH SCOPE OF WORK

(E) E OCCUPANCY WITH NO SCOPE OF WORK

PH — PANIC HARDWARE

(E) S OCCUPANCY WITH NO SCOPE OF WORK

(E) WOOD STUD FRAMED WALLS

(E) 2-HR FIRE SEPARATED WOOD STUD FRAMED WALLS

(E) 1-HR FIRE SEPARATED "MODULAR" SYSTEM PARTITION

1-HR SHAFT FIRE BARRIER

LIONÄKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com
CONSULTANT

SEAL

LICENSED ARCHITECT BRIAN BELL C28712 REN 01-31-25 STATE OF CALIFORNIA

PROJECT
JOHN F KENNEDY HIGH SCHOOL
SWIMMING POOL UPGRADE

6715 GLORIA DR
SACRAMENTO, CA 95831

CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

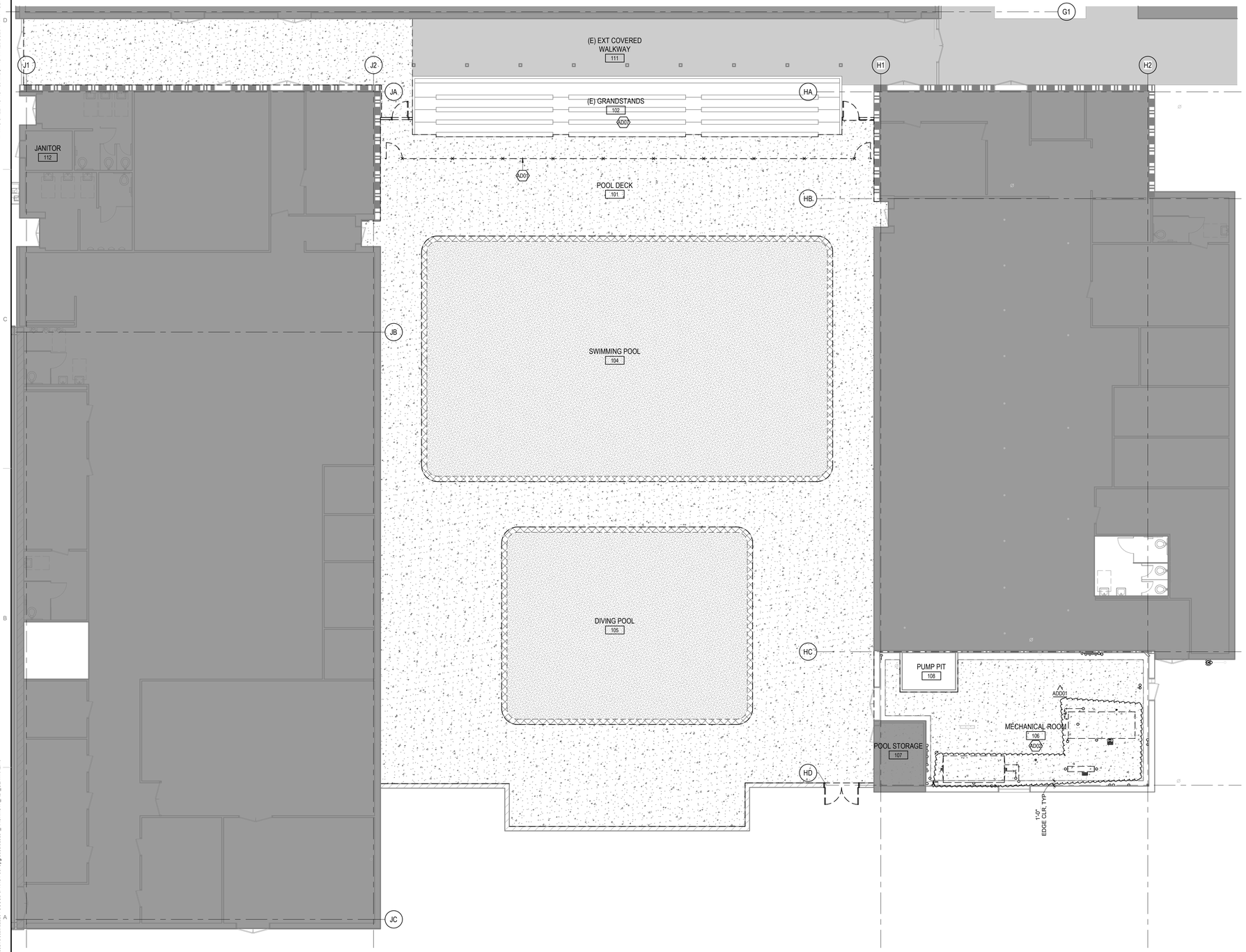
MARK	DATE	DESCRIPTION
ADD01	5/10/2024	ADD 01

MANAGEMENT

LIONAKIS PROJECT NO: 023264
CLIENT PROJECT NO:
COPYRIGHT: LIONAKIS 2017

TITLE
LIFE SAFETY FLOOR PLAN - POOL

SHEET
GL111



1 DEMOLITION FLOOR PLAN - LEVEL 1 - OVERALL

SCALE 1/8" = 1'-0"

GENERAL NOTES

1. REFER TO DOOR AND FRAME SCHEDULES FOR REFERENCED FRAMED OPENINGS AND REQUIRED DEMOLITION OF OPENINGS IN EXISTING CONCRETE WALLS TO ACCOMMODATE FRAMED OPENINGS.
2. COORDINATE WITH OWNER ALL ITEMS NOTED TO BE TURNED OVER TO THE DISTRICT.
3. DEMOLITION KEYNOTES ARE FOR REFERENCE AS AN OVERALL LIST. NOT ALL DEMOLITION NOTES LISTED ARE APPLICABLE TO EACH SHEET. REFER TO SPECIFIC DEMOLITION PLANS FOR NOTES THAT APPLY.
4. IN AREAS OF DEMOLISHED FLOOR AND WALL FINISHES, CONTRACTOR SHALL BE RESPONSIBLE TO FULLY REMOVE ALL EXISTING CONSTRUCTION MATERIAL INCLUSIVE OF EXISTING ADHESIVES AND/OR MECHANICAL FASTENERS AND CERAMIC TILE MORTAR BED. CONTRACTOR SHALL PREP ALL EXISTING SURFACES AS REQUIRED TO ACCOMMODATE FINISHES (INCLUDING MECHANICAL ABRADING OF EXISTING SURFACES AND FILLING OF HOLES, WITH APPROPRIATE MATERIALS, AS NECESSARY).
5. IN AREAS OF DEMOLISHED PLUMBING FIXTURES, ALL REMAINING DRAIN PIPES, TUBING, ETC. SHALL BE ABANDONED AND CAPPED OFF IN SUCH A WAY THAT IT SHALL NOT INTRUDE ON ANY CONSTRUCTION. PATCH FINISHES AS NECESSARY.
6. REFER TO SWIMMING DRAWINGS FOR EXTENT OF DEMOLITION REQUIRED FOR INSTALLATION OF SWIMMING POOL WORK.
7. REFER TO MECHANICAL/PLUMBING AND ELECTRICAL DRAWINGS FOR ADDITIONAL DEMOLITION WORK REQ'D TO ACCOMMODATE CONSTRUCTION, INCLUDING FILTERING OF VENTS, DIFFUSERS, AND CONDUITS WITH UNISTRATS.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY BARRIERS AND/OR ACCESS ENCLOSURES TO PROVIDE A MEANS OF CONTROLLED ACCESS TO THE FACILITY FUNCTIONS DURING SEQUENCING OF CONSTRUCTION. VERIFY ALL BARRIER LOCATIONS WITH OWNER PRIOR TO INSTALLATION.
9. CONTRACTOR SHALL COORDINATE AND MAINTAIN FIRE AND LIFE SAFETY REQUIREMENTS PER CFC CHAPTER 14 DURING RENOVATIONS OF EXISTING FACILITY.
10. MEANS OF EGRESS FOR EXISTING BUILDINGS SHALL COMPLY WITH CFC SECTION 1027 AND MAINTENANCE OF MEANS OF EGRESS SHALL COMPLY WITH CFC SECTION 1028.
11. (E) FLOOR EQUIPMENT ANCHORAGE TO BE REMOVED AND PATCHED.

DEMOLITION FLOOR PLAN LEGEND

- DASHED LINE INDICATES ITEM TO BE DEMOLISHED
- (E) WALL TO BE REMOVED TO EXTENT SHOWN
- (E) WALL TO REMAIN
- (E) DOOR TO BE REMOVED. SALVAGE DOOR HARDWARE COMPONENTS
- (E) DOOR TO REMAIN
- (E) POOL DECK/CONC SLAB ON GRADE TO BE REMOVED, FOR ADDITIONAL INFO, SEE CIVIL AND POOL DWGS
- ADD01
- (E) POOL FINISHES TO BE REMOVED. (E) CONC SHELL TO REMAIN, SAWCUT WHERE REQUIRED FOR NEW CONNECTIONS, SEE POOL DWGS
- (E) POOL COPING TO BE REMOVED, SEE POOL DWGS
- (E) BUILDING NOT IN SCOPE
- (E) COVERED WALKWAY NOT IN SCOPE

SHEET KEYNOTES

AD01 DEMO (E) CHAIN-LINK FENCING AND GATE ASSEMBLY.

AD02 DEMO (E) MECHANICAL EQ, SEE POOL, MECH, AND ELEC DWGS

AD07 REMOVE (E) FINISH COAT ON (E) GRANDSTAND ASSEMBLY, SUPPORTS, AND METAL ANGLE EMBED. CLEAN AND PATCH AND REPAIR (E) CONC STEPS.

LIONÄKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com

CONSULTANT

SEAL

LICENSED ARCHITECT BRIAN BELL C28712 REN 01-31-25 STATE OF CALIFORNIA

PROJECT
JOHN F KENNEDY HIGH SCHOOL SWIMMING POOL UPGRADE

6715 GLORIA DR
SACRAMENTO, CA 95831

CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

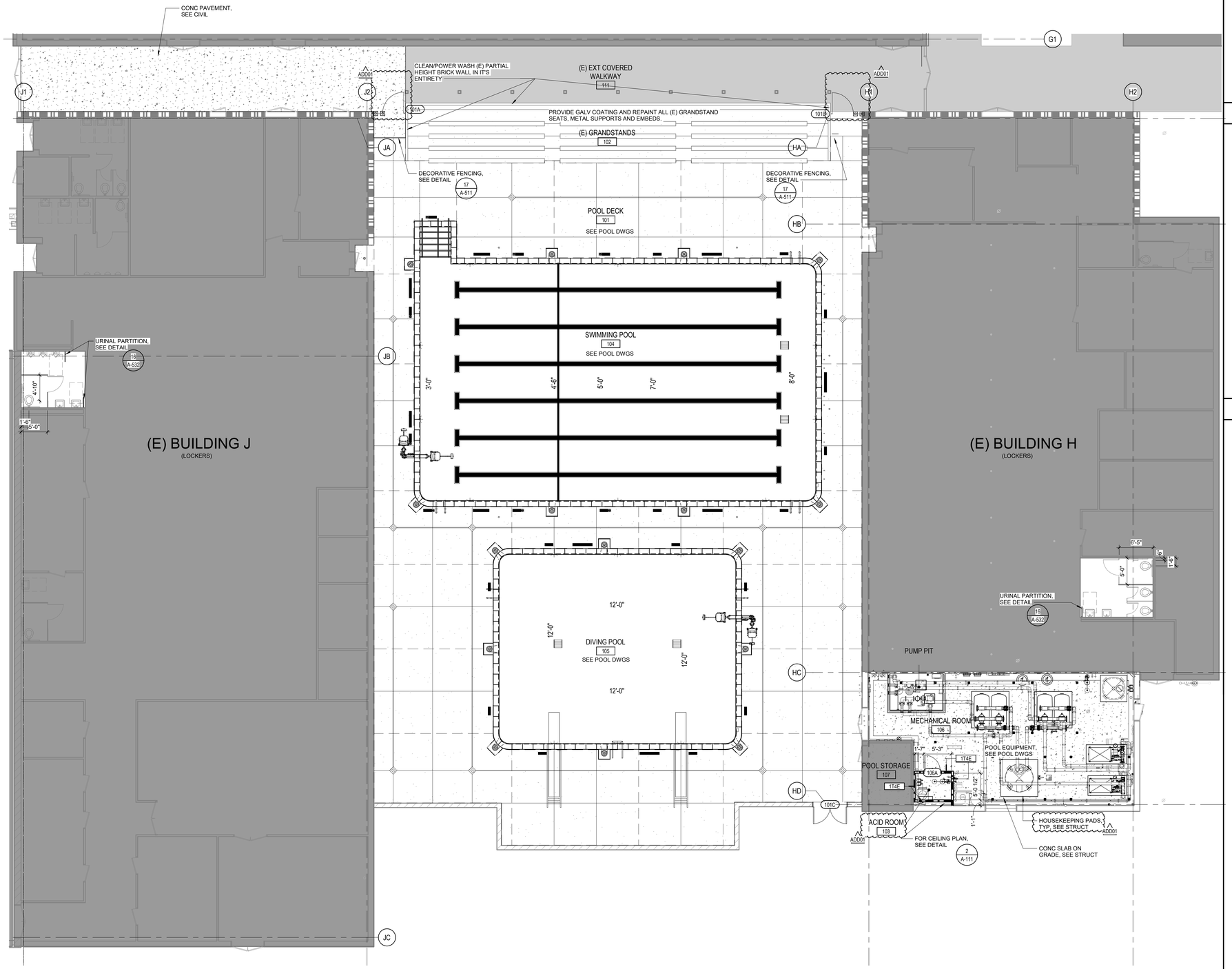
MARK	DATE	DESCRIPTION
ADD01	5/10/2024	ADD 01

MANAGEMENT

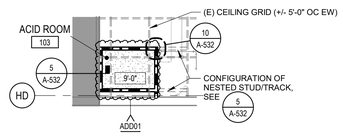
LIONAKIS PROJECT NO: 023264
CLIENT PROJECT NO:

TITLE
DEMOLITION FLOOR PLAN - LEVEL 1

SHEET
AD111



1 FLOOR PLAN - POOL
SCALE 1/8" = 1'-0"



2 CEILING PLAN - ACID ROOM
SCALE 1/8" = 1'-0"

GENERAL NOTES

1. ALL WALL DIMENSIONS ARE MEASURED FROM FACE OF STUDS OR CENTERLINE OF COLUMN GRID UNLESS OTHERWISE NOTED. EXCEPTION: CLEAR DIMENSIONS AT DOOR, PLUMBING FIXTURES AND 5'-0" DIA FLOOR CLEARANCE CIRCLE ARE TO FACE OF FINISH, TYP.
2. DIMENSIONS NOTED "CLEAR" OR "CLR" ARE TO FACE OF FINISH.
3. ACCESS TO EXISTING EXIT WAYS TO REMAIN OPEN AT ALL TIMES DURING CONSTRUCTION.
4. FOR SYMBOL LEGEND SEE SHEET G-001
5. PATCH AND REPAIR EXISTING PORTIONS OF BUILDING TO REMAIN THAT ARE DAMAGED DURING DEMOLITION. DOCUMENT ALL EXISTING DAMAGED CONDITIONS PRIOR TO DEMOLITION.
6. PROTECT AS NECESSARY ALL EXISTING CONSTRUCTION TO REMAIN AND IN-PLACE CONSTRUCTION DURING CONSTRUCTION PROCEDURES.

FLOOR PLAN LEGEND

ROOM NAME / 101 — ROOM IDENTIFIER WITH ROOM NAME & NUMBER

100 — DOOR/GATE , SEE DOOR SCHEDULE SHEET A-511 AND A-532

DOOR/GATE OPENING IDENTIFIER

PH — PANIC HARDWARE

60" CLEAR ACCESSIBLE TURNING SPACE

(E) COVERED WALKWAY NOT IN SCOPE

(E) BUILDING NOT IN SCOPE

2W12W A — WALL TAG, SEE PARTITION SCHEDULE

WALL LEGEND

(E) WOOD STUD FRAMED WALLS

(E) 2-HR FIRE SEPARATED WOOD STUD FRAMED WALLS

(E) 1-HR FIRE SEPARATED "MODULAR" SYSTEM PARTITION. METAL STUDS @ 40" OC W/ STEEL COVERED GYP BD PANELS.

1-HR FIRE BARRIER, SEE SHEET A-531 FOR TYPE

LIONAKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com
CONSULTANT

SEAL

LICENSED ARCHITECT
BRIAN BELL
C28712
REN 01-31-25
STATE OF CALIFORNIA

PROJECT
JOHN F KENNEDY HIGH SCHOOL
SWIMMING POOL UPGRADE

6715 GLORIA DR
SACRAMENTO, CA 95831

CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

MARK	DATE	DESCRIPTION
ADD01	5/10/2024	ADD 01

MANAGEMENT

LIONAKIS PROJECT NO:	023264
CLIENT PROJECT NO:	
COPYRIGHT:	LIONAKIS 2017

TITLE
FLOOR PLAN - LEVEL 1

SHEET
A-111

EWH-1 WATER HEATER SIZING
ELECTRIC TANK TYPE - KITCHEN AREA D

SYMBOL	FIXTURE NAME	QTY	USER HW TEMP	GPH EACH @ USER TEMP	GPH EACH @ WH TEMP	GPH TOTAL PER ITEM
(E) LAV	COMMERCIAL - LAVATORY	17	105.00	6.00	4.62	78.46
(E) SH	SHOWER	4	105.00	30.00	23.08	92.31
(E) MS	SERVICE SINK	2	120.00	20.00	20.00	40.00
WMB	CLOTHES WASHING MACHINE CONNECTION BOX	0.00	120.00	40.00	40.00	0.00
ESH-EW	EMERGENCY SHOWER-EYEWASH	2	68.00	345	69.00	138.00
					TOTAL GPH	348.77

INLET TEMP	55.00		TANK VOL	100	GALLONS
WH TEMP	120.00		±1ST HR RECOV @ ΔT	347.91	GALLONS
TEMP DIFF, ΔT	65.00		1KW =	3412.142	BTUH
WATER HEATER EFFICIENCY	0.980				
GPH USAGE DIVERSITY FACTOR	0.75				
GPH WITH DIV FACTOR = TOTAL GPH X FACTOR	261.58				

POWER INPUT =	GPH X TEMP DIFF X 8.33LBS/GAL X 1BTU/LB/°F / WATER HEATER EFF	
=	144,521.25	BTUH
=	42.35	KW
USE =	45.00	KW
	277.91	GPH RECOVERY EQUIV @ CONSTANT EFF @ TEMP DIFF ABV

NOTES:	
1.0	USER HW TEMP VALUES SHOWN ABOVE ARE ASSUMED WARMEST BEARABLE TEMPERED WATER AT FAUCET OUTLET, SET BY USER UNLESS SHOWN OTHERWISE. SEE PLUMBING FIXTURE SCHEDULE FOR TEMP SETTING SPECIFICS AT FIXTURE OR AT POINT OF USE TMV IF ANY.
2.0	WARNING: PER ASHRAE CHAPTER 50 FIGURE 9, IT TAKES ABT 10 MINS TO CAUSE 3RD DEGREE BURNS USING 120F HOT WATER. FOR 140F HOTWATER, IT ONLY TAKES ABOUT 5 SECONDS TO DO SAME DAMAGE. PLEASE LIMIT HOT WATER TEMP THRU USE OF THERMOSTATIC MIXING VALVES OR USE OF INTEGRAL LIMITING DEVICE IF AVAILABLE.
3.0	1ST HR RECOVERY BASED FROM 0.7xWH TANK VOLUME + PERFORMANCE GPH
4.0	CPC 2022 416.1 EMERGENCY EYEWASH & SHOWER EQUIPMENT SHALL COMPLY WITH ANSI/ISEA Z358.1 (TEPID WATER 60-100°F). EMERGENCY SHOWER SHALL BE NO LESS THAN 20GPM FOR 15 MINUTES, EYEWASH NO LESS THAN 0.4GPM FOR 15 MINUTES, AND EYE-FACE WASH NO LESS THAN 3.0GPM FOR 15MINUTES.
5.0	WATER TEMPERATURE FOR LAV SINKS AND HANDWASHING STATIONS COMPLYING WITH CAL RETAIL CODE SHALL BE AT LEAST 100F, BUT NOT GREATER THAN 108F. CAL RETAIL CODE 113953
6.0	GPH USAGE DIVERSITY FACTOR SHALL BE EQUAL TO PEAK DEMAND X CHANCES OF PEAK DEMAND BEING REACHED
7.0	GPH @ WATER HEATER TEMPERATURE = GPH@USER TEMP x (USER HW TEMP - INLET CW TEMP)/ (WH TEMP - CW INLET TEMP); SEE ASPE HANDBOOK #2 EQUATION 6-6 FOR MORE INFORMATION.
8.0	$Q = mc\Delta T$; $Q/t = m/t * c * \Delta T$; c = sp heat of fluid = 1BTU/lb/F; 8.33lbs of H_2O = 1 Gal of H_2O; Q in BTU and Q/t in BTUH

GAS PRESSURE REGULATOR SCHEDULE

UNIT	LOCATION	"MFR" MODEL NO. SIZE	MAX LOAD < GPR MAX (MBH)	MAX INDIVIDUAL LOAD (MBH)	MIN & MAX INLET PRESSURE	OUTLET PRESSURE	NOTES
GPR H1	BLDG H POOL EQUIP RM	MAXITROL 325-11L210G 2" X 2"	3000 < 4500	1500 < 4500	1.5 PSI MIN 5 PSI MAX	7"-11"WC	1 2 3 4 5 6 7 8

NOTES:

1. FOR INDOOR INSTALLATION, PROVIDE VENT LIMITER ACCESSORY (CPC 1208.8.4) OR RUN VENT TO OUTDOORS IF SHOWN ON PLANS. FOR OUTDOOR INSTALLATION, PROVIDE MAXITROL VENT PROTECTOR ACCESSORY. PROVIDE MODEL WITH SUFFIX "B" IMBLUE TECHNOLOGY FOR INCREASED CORROSION RESISTANCE IF LOCATED OUTDOORS OR IN CORROSIVE ENVIRONMENTS. VENT LIMITER AND VENT PROTECTION FOR MAXITROL 325-L SERIES ARE AVAILABLE FOR MODELS 325-3 THRU 325-9 ONLY.
2. VERIFY MINIMUM AND MAXIMUM PRESSURE REQUIRED BY APPLIANCES TO BE SERVED PRIOR TO PROCUREMENT.
3. PROVIDE SOV ON BOTH SIDES OF GPR. GPR INLET & OUTLET SIZE SHALL BE EQUAL TO THE LARGER OF THE CONNECTING UPSTREAM OR DOWNSTREAM PIPE. SEE SITE PLAN/FLOOR PLANS FOR MORE INFORMATION.
4. PROVIDE PIPE LENGTH OF 10 TIMES THE PIPE DIAMETER BEFORE CHANGING DIRECTION DOWNSTREAM OF GPR. SEE GPR INSTALLATION INSTRUCTIONS FOR MORE INFORMATION.
5. PROVIDE ½" GAUGE PORT WITH SOV AT THE OUTLET SIDE OF THE GAS REGULATOR. PROVIDE CAP AND SEAL AIR TIGHT.
6. MINIMUM MBH CAPACITY ABOVE IS THE TOTAL MBH REQUIREMENT OF THE SYSTEM DOWNSTREAM OF THE GPR. ANY SUBSTITUTED PRODUCT SHALL BE ANSI Z21.80 CERTIFIED, AND SHALL BE WITHIN PARAMETERS SET FORTH ABV. SIZE OF SUBSTITUTED REGULATOR SHALL BE SIMILAR TO SIZE OF THE OUTLET PIPE.
7. REGULATOR VENT SHALL TERMINATE AT LEAST 3FT FROM ANY SOURCE OF IGNITION. CPC 1208.8.4 (3)

ELECTRIC WATER HEATER SCHEDULE

UNIT	LOCATION	"AO SMITH" MODEL NO.	STORAGE CAPACITY GALLONS	RECOVERY GALLONS @ 100°F RISE	TEMP SETTING	KW	VOLTAGE	AMPS	WEIGHT (FULL)	PIPING DETAIL	MOUNTING DETAIL	NOTES
EWH H1	BLDG H MECH RM 106	DSE-100A 45KW	100	184	140°F	45	480-3PH	54.1	1300LBS	1/P-501	8/P-501	2 x 50A CONTACTORS. PROVIDE 4" HOUSE KEEPING PAD AND DRAIN PAN. SLOPE DRAIN FROM PAN TO APPROVED RECEPTOR. SET WATER HEATER TO 140F.

CIRCULATING PUMP SCHEDULE

UNIT	LOCATION	"B&G" MODEL NO.	GPM	FT OF HEAD	WATTS	VOLTAGE	NOTES
CP H1	BLDG H MECH RM 106	NBF-12U	5	8.0	55	115V/1∅	9.5 LBS; 0.48FLA. PROVIDE AQUASTAT TO TURN PUMP AT 115F, OFF AT 120F. PROVIDE TIMER, COORDINATE SCHEDULE WITH DISTRICT
CP H2	BLDG H MECH RM 106	NBF-12U	5	8.0	55	115V/1∅	9.5 LBS; 0.48FLA. PROVIDE AQUASTAT TO TURN PUMP AT 115F, OFF AT 120F. PROVIDE TIMER, COORDINATE SCHEDULE WITH DISTRICT

EXPANSION TANK SCHEDULE

UNIT	LOCATION	"AMTROL" MODEL NO.	TANK VOLUME GALLONS	MAX. ACCEPT. VOLUME	DETAIL	NOTES
ET H1	BLDG H MECH RM 106	THERM-X-TROL ST-25V	10.3	10.3	-	3/4"NPTM CONNECTION, 15"DIAMETER. OPERATING WEIGHT 110LBS

TEMPERATURE MIXING VALVE

UNIT	LOCATION	"POWERS" MODEL NO.	CV	PSI DROP / @ GPM	MIN. FLOWRATE (GPM)	MIN WALL SPACE REQ'D (LxHxDEPTH)	NOTES
TMV H1	BLDG H MECH RM 106	LFSH1434-13	19.00	5 / 42	1	16"x10"x6"	1 ¼"INLETS, 1 ½"OUTLET, ASSE 1017 APPROVED, HI-LO COMPACT. SET OUTLET TEMP TO 130°F. SERVES LOCKER ROOMS & BOY'S SHOWERS.
TMV H2	BLDG H MECH RM 106	LFSH1434-13	19.00	5 / 42	1	16"x10"x6"	1 ¼"INLETS, 1 ½"OUTLET, ASSE 1017 APPROVED, HI-LO COMPACT. SET OUTLET TEMP TO 110°F. SERVES GIRL'S SHOWERS.

NOTES:
1. PRESSURE DROP = (FLOWRATE / (CV/SG))^2; SG for water = 1
2. MIN WALL SPACE ABOVE DOES NOT INCLUDE REQUIRED WORKING CLEARANCE AROUND VALVES. COORDINATE SHOP DRAWINGS.

ROOM EXHAUST DESIGN CALCULATION

ADD01

ROOM NAME & NUMBER	ROOM AREA (SF)	MINIMUM EXHAUST RATE / AREA PER CMC TABLE 403.7 (CFM/SF)	MINIMUM EXHAUST RATE (CFM)	EXHAUST RATE PROVIDED (CFM)
ACID ROOM	34.5	1.5	51.7	240.0
MECHANICAL ROOM	1105.0	1.5	1657.5	1100 X 2

NOTES:
1. EXHAUST RATE PER 2022 CMC TABLE 403.7

CHEMICAL ROOM EXHAUST FAN

ADD01

CEF H1	"FANAM" CHEMICAL EXHAUST FAN (CEF) MODEL CBI-160, 240 CFM AT 0.5" SP. 115/208 V 1PH 9.0/ 5.4 AMP, 0.25HP, 1725 RPM MOTOR. EXHAUST FAN WITH 8" PVC VENTING THRU ROOF. COORDINATE SHOP DRAWINGS AMONGST TRADES PRIOR TO ANY INSTALLATION. SEE DETAIL 3/P-501 AND 7/P-501. WEIGHT = 27 LBS. PROVIDE AIR BALANCING REPORT ENSURING EXHAUST RATE IS PER MINIMUM REQUIREMENTS OF PLAN. PROVIDE ACTUAL STATIC PRESSURE & EXHAUST CFM AT EXHAUST PIPE ENTRANCE. SEE SPECIFICATIONS 23 80 00 & 23 05 93.
CEF H2 X 2	"FANAM" CHEMICAL EXHAUST FAN (CEF) MODEL CBI-225, 1100 CFM AT 0.5" SP. 115/208 V 1PH 5.4/ 2.6 AMP, 0.25HP, 1725 RPM MOTOR. EXHAUST FAN WITH 10" PVC VENTING THRU ROOF. COORDINATE SHOP DRAWINGS AMONGST TRADES PRIOR TO ANY INSTALLATION. SEE DETAIL 3/P-501 AND 7/P-501. WEIGHT = 62 LBS. PROVIDE AIR BALANCING REPORT ENSURING EXHAUST RATE IS PER MINIMUM REQUIREMENTS OF PLAN. PROVIDE ACTUAL STATIC PRESSURE & EXHAUST CFM AT EXHAUST PIPE ENTRANCE. SEE SPECIFICATIONS 23 80 00 & 23 05 93.

PLUMBING FIXTURE SPECIFICATION & CONNECTION SCHEDULE

ADA	SYMBOL	FIXTURE	FIXTURE MANUFACTURER AND MODEL No.	FAUCET OR VALVE MANUFACTURER AND MODEL No.	TRIM MANUFACTURER AND MODEL No.	REMARKS	VENT	WASTE BRANCH	WASTE OUTLET	COLD WATER BRANCH	COLD WATER OUTLET	HOT WATER BRANCH	HOT WATER OUTLET
	BFP-1	BACKFLOW PREVENTER POOL SYSTEM	"ZURN" WILKINS 375 PROVIDE AIR GAP AND DRAIN TO NEAREST APPROVED RECEPTOR.										
	BFP-2	BACKFLOW PREVENTER BOILER - MAKE-UP WATER	"ZURN" WILKINS 975XL2. PROVIDE AIR GAP AND DRAIN TO NEAREST APPROVED RECEPTOR.										
	FS	FLOOR SINK	MECHANICAL SPACES - ZURN MODEL ZN-1901-KC-2, OR EQUAL, 12 INCH x 12 INCH x 8 INCH DEEP, A.R.E. INTERIOR WITH NICKEL BRONZE RIM, HALF GRATE AND DOME STRAINER. OTHER APPROVED EQUAL MANUFACTURERS INCLUDE: JAY R. SMITH, WATTS & MIFAB.	PROVIDE SEEPAGE PAN WITH CLAMPING COLLAR.		COORDINATE & PROVIDE GRATES AS REQUIRED PER KITCHEN DRAWINGS	2" 3"	2" 3"	2" 3"	- -	- -	- -	- -
	FD	FLOOR DRAIN	GENERAL SERVICE FD - ZURN MODEL Z-415, OR EQUAL, WITH TYPE "B" STRAINER FOR EXPOSED CONCRETE AND TYPE "S" STRAINER FOR TILE FLOOR. PROVIDE BRONZE TRIM.				2"	2"	2"	-	-	-	-
	TP TP-2	TRAP PRIMER ELEC TRAP PRIMER	MIFAB "M-500" SERIES, REQUIRES 3PSI DROP TO ACTIVATE. SIOUX CHIEF 695-ES01 ELECTRONIC TRAP PRIMER, PROVIDE DISTRIBUTION SPLITTER TO PRIME UP TO 8 DRAINS. PROVIDE 120VAC 9.2WATTS 60HZ POWER SUPPLY.			PROVIDE ACCESS PANEL SEE DETAIL 6/P-502	-	-	-	1/2"	1/2"	-	-
	HB	HOSE BIBB	INTERIOR WALL MOUNTED - ACORN MODEL 8121CP-LF WOODFORD MODEL 24PC, OR EQUAL. ROOF MOUNTED - WOODFORD MODEL RHMC-MS WITH INTEGRAL UNDERDECK FLANGE , OR EQUAL. ROOF MOUNTED ON PARAPET OR SIDE OF AC UNIT - ACORN MODEL 8121CR-LF OR WOODFORD MODEL 24CH, OR EQUAL.	WITH INTEGRAL VACUUM BREAKER PROTECTED, CARTRIDGE OPERATED HOSE VALVE WITH LOCK SHIELD BONNET AND REMOVABLE KEY HANDLE.		SET HEIGHT AT 18" ABOVE FINISHED FLOOR OR AS INDICATED ON ARCHITECTURAL DRAWINGS	-	-	-	1"	3/4"	-	-
	WH	WALL HYDRANT COLD WATER ONLY	EXTERIOR WALL MOUNTED RECESSED WOODFORD MODEL B65 OR EQUAL.	WITH INTEGRAL VACUUM BREAKER PROTECTED, CARTRIDGE OPERATED HOSE VALVE WITH LOCK SHIELD BONNET AND LOOSE KEY OPERATION.		SET HEIGHT AT 18" ABOVE FINISHED FLOOR OR AS INDICATED ON ARCHITECTURAL DRAWINGS	-	-	-	1"	3/4"	-	-
	WHA	WATER HAMMER ARRESTOR	SEE SPECIFICATIONS										
	ESH-1	EMERGENCY SHOWER	SEE POOL DRAWINGS FOR EMERGENCY SHOWER-EYEWASH COMBO MODEL NUMBER. PROVIDE TMV & SOV TO ESH-EW. TMV ACCESSORY SHALL BE FROM SAME MANUFACTURER AS THE EMERGENCY SHOWER-EYEWASH COMBO.										

GENERAL NOTES:

1. WATER SUPPLIES AND STOPS:
   - A. PROVIDE 85 PERCENT IPS RED BRASS PIPE, SECURELY ANCHORED TO BUILDING CONSTRUCTION, FOR EACH CONNECTION TO FAUCETS, STOPS, HOSE BIBBS, ETC. EACH FIXTURE, EXCEPT HOSE BIBBS, SHALL HAVE A STOP VALVE INSTALLED ON WATER SUPPLY LINES TO PERMIT REPAIRS WITHOUT SHUTTING OFF WATER MAINS.
   - B. PROVIDE ALL WATER SUPPLIES TO FIXTURES WITH COMPRESSION SHUT-OFF STOPS WITH IPS INLETS WITH THREADED BRASS NIPPLES AT PIPE CONNECTION AND LOCK SHIELD LOOSE KEY. PROVIDE COMBINATION FIXTURES WITH COMPRESSION STOP AND IPS INLET ON EACH WATER SUPPLY FITTING. PROVIDE LOOSE KEY HANDLE FOR EACH STOP.
   - C. PROVIDE 1/2 INCH RISER TUBES WITH REDUCING COUPLING FOR ALL FIXTURES, UNLESS OTHERWISE NOTED. REFER TO SPECIFICATION SECTION 22 40 00.
2. PIPE, PLUMBING FITTINGS, FIXTURES, SOLDER AND FLUX SHALL COMPLY WITH LEAD FREE REQUIREMENTS OF THE CALIFORNIA HEALTH AND SAFETY CODE SECTION 116875. PROVIDE PRODUCTS LISTED AND LABELED AS COMPLYING WITH NSF 61, ANNEX G, OR PROVIDE OTHER EVIDENCE OF COMPLIANCE WITH THE CALIFORNIA HEALTH AND SAFETY CODE SECTION 116875. PROVIDE PRODUCT SUBMITTAL INFORMATION PROVING COMPLIANCE WITH LEAD FREE REQUIREMENTS. ALSO SEE GENERAL NOTE 22 ON SHEET P0.1 AND SPECIFICATION SECTIONS, 22 00 50, 22 10 00 AND 22 40 00.

LIONAKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com

CONSULTANT
capital engineering
RANCHO CORDOVA, CALIFORNIA
MB - JV | 232142.00
PM - DESIGN TEAM | PROJECT NO.

SEAL
REGISTERED PROFESSIONAL ENGINEER · KEVIN D. STILWELL · M 33498 · EXPIRES 9/30/24 · MECHANICAL · STATE OF CALIFORNIA
DATE SIGNED: 2024-04-29

PROJECT
JOHN F KENNEDY HIGH SCHOOL SWIMMING POOL UPGRADE
6715 GLORIA DR
SACRAMENTO, CA 95831

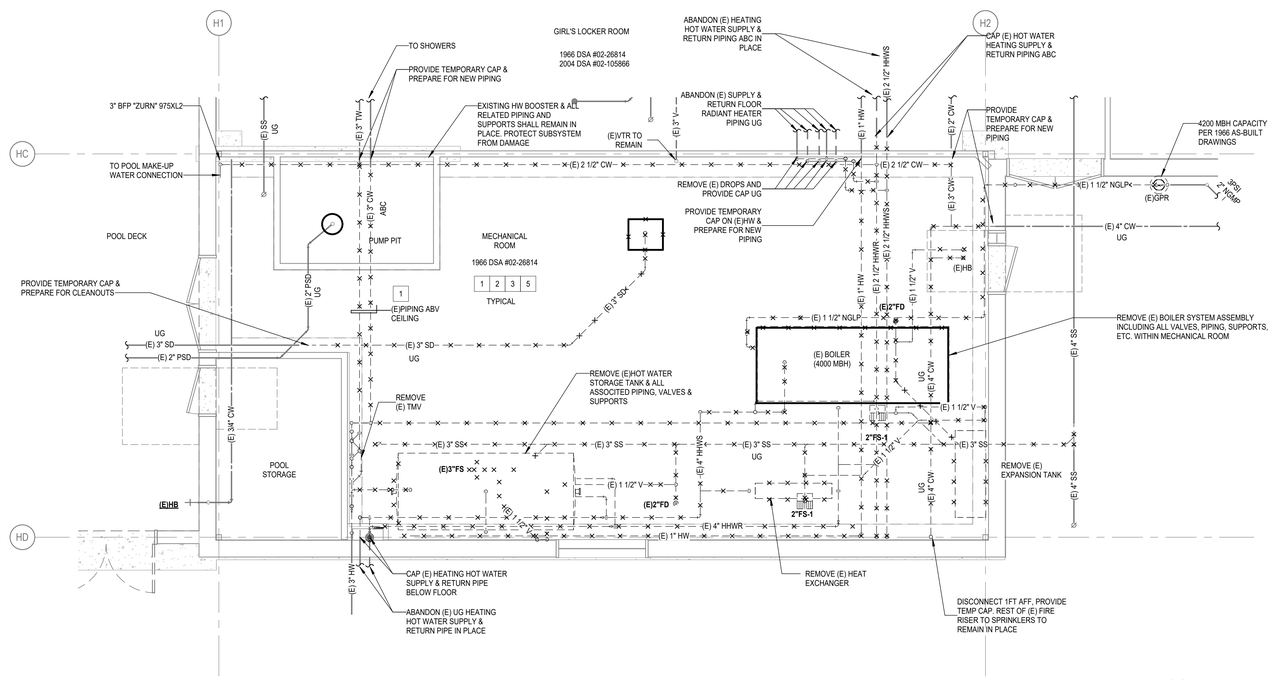
CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

MARK	DATE	DESCRIPTION
ADD01	05/13/2024	ADDENDUM#01

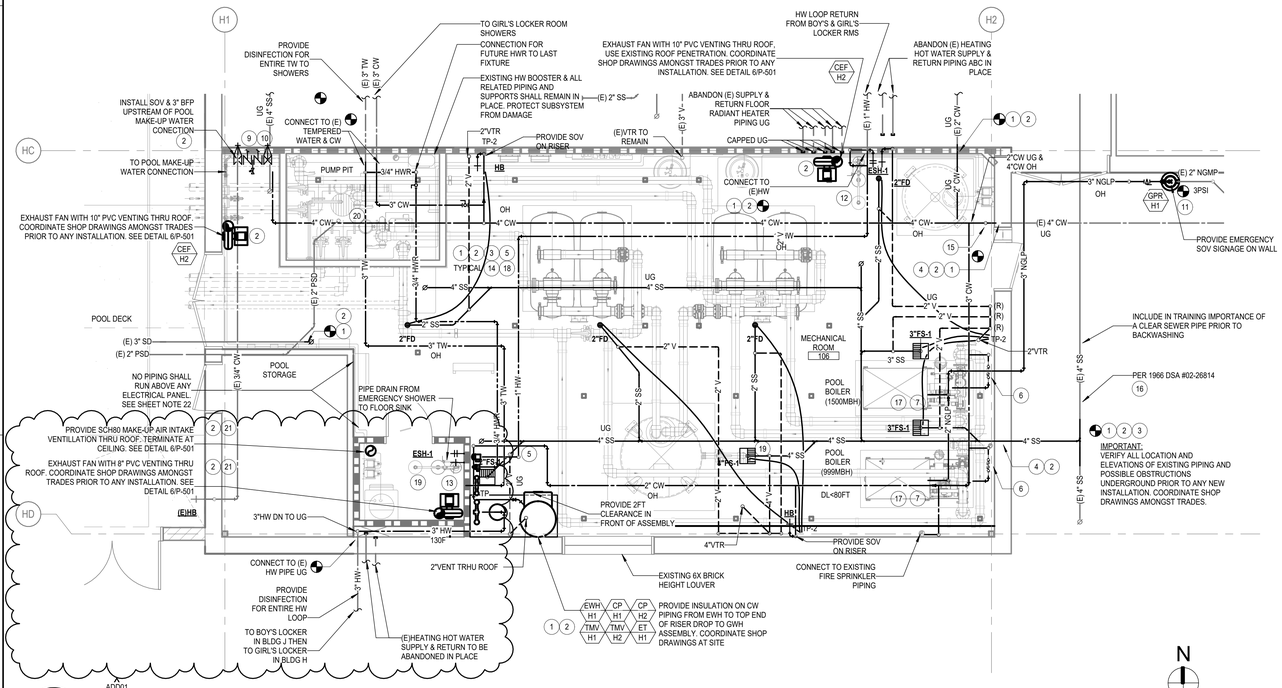
MANAGEMENT
LIONAKIS PROJECT NO: 023264
CLIENT PROJECT NO:

TITLE
PLUMBING EQUIPMENT SCHEDULE



1 P-411 ENLARGED PLUMBING DEMO PLAN - POOL MECHANICAL ROOM

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



2 P-411 PLUMBING FLOOR PLAN

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

ADD01

PLUMBING DEMO KEY NOTES:

1. VERIFY EXACT SIZE AND LOCATION OF EXISTING PIPE. REFLECT VERIFIED INFORMATION ON SHOP DRAWINGS FOR COORDINATION AMONGST TRADES PRIOR TO ANY PIPE INSTALLATION. REFLECT ON AS-BUILT DRAWING IF DIFFERENT FROM HEREWITH.
2. VERIFY EXACT LOCATION OF ALL BUILDING COMPONENTS THAT MAY OBSTRUCT PATH OF NEW PIPING WELL AHEAD OF INSTALLATION. REFLECT VERIFIED INFORMATION ON SHOP DRAWINGS AND COORDINATE AMONGST TRADES PRIOR TO ANY PIPE INSTALLATION. REROUTE PIPING IF REQUIRED, REFLECT ON AS-BUILT DRAWINGS IF DIFFERENT FROM HEREWITH.
3. ENSURE ALL CONDITIONS AFFECTING WORK, SUCH AS VERIFICATION OF TIE-IN ELEVATION TO EXISTING BY OTHERS, ARE WELL COORDINATED AMONGST TRADES PRIOR TO ANY INSTALLATION OR FABRICATION WORK. ADJUST PIPE ROUTE IF NEEDED. REFLECT ON AS-BUILTS IF DIFFERENT FROM HEREWITH.
5. UNLESS NOTED OTHERWISE, REMOVE ALL EXISTING UNUSED MECHANICAL AND PLUMBING PIPING WITHIN MECHANICAL ROOM. COORDINATE ALL DEMO WORK AMONGST TRADES AND WITH SCHOOL DISTRICT PRIOR TO DEMO WORK.

PLUMBING KEY NOTES:

1. VERIFY EXACT SIZE AND LOCATION OF EXISTING PIPE. REFLECT VERIFIED INFORMATION ON SHOP DRAWINGS FOR COORDINATION AMONGST TRADES PRIOR TO ANY PIPE INSTALLATION. REFLECT ON AS-BUILT DRAWING IF DIFFERENT FROM HEREWITH.
2. VERIFY EXACT LOCATION OF ALL BUILDING COMPONENTS THAT MAY OBSTRUCT PATH OF NEW PIPING WELL AHEAD OF INSTALLATION. REFLECT VERIFIED INFORMATION ON SHOP DRAWINGS AND COORDINATE AMONGST TRADES PRIOR TO ANY PIPE INSTALLATION. REROUTE PIPING IF REQUIRED, REFLECT ON AS-BUILT DRAWINGS IF DIFFERENT FROM HEREWITH.
3. ENSURE ALL CONDITIONS AFFECTING WORK, SUCH AS VERIFICATION OF TIE-IN ELEVATION TO EXISTING BY OTHERS, ARE WELL COORDINATED AMONGST TRADES PRIOR TO ANY INSTALLATION OR FABRICATION WORK. ADJUST PIPE ROUTE IF NEEDED. REFLECT ON AS-BUILTS IF DIFFERENT FROM HEREWITH.
4. SEE STRUCTURAL DRAWINGS FOR PROVISIONS ON & REQUIREMENTS WHEN RUNNING PIPE THROUGH, BELOW OR IN CLOSE PROXIMITY TO STRUCTURAL COMPONENTS. COORDINATE ALL SHOP DRAWINGS AMONGST TRADES PRIOR TO ANY INSTALLATION.
5. ALL PLUMBING COMPONENTS SHALL RUN NEATLY ON WALL OR AS CLOSE AS POSSIBLE TO EQUIPMENT SERVED. NO COMPONENT SHALL PROTRUDE OUT ENCROACHING PERSONNEL PATH OF TRAVEL NOR WITHIN ANY AREA RESERVED FOR SERVICE CLEARANCE OF OTHER UNITS WITHIN ROOM. COORDINATE ALL SHOP DRAWINGS PRIOR TO ANY INSTALLATION.
6. CW MAKE-UP WATER FOR POOL BOILERS. PROVIDE SOV, BFP-2 & PRV NO HIGHER THAN 3FT FROM FF. SET PRV TO 15PSI. SEE BOILER INSTALLATION INSTRUCTIONS FOR MORE INFORMATION. PROVIDE AIR GAP AND DRAIN LINE TO NEAREST APPROVED RECEPTOR.
7. CONNECT GAS PIPE TO POOL BOILER. PROVIDE SOV & DIRT LEG. SEE BOILER INSTALLATION INSTRUCTIONS FOR MORE INFORMATION.
9. MAKE-UP WATER FOR POOL SYSTEM. PROVIDE SOV ON RISER ABOUT 4.00' ABOVE FLOOR.
10. BFP-1 WILKINS 375. PROVIDE AIR GAP FITTING AND DRAIN TO PIT. REFER TO POOL DRAWINGS FOR EXACT LOCATION
11. INSTALL GAS REGULATOR 3FT MINIMUM AWAY FROM IGNITION SOURCES. TYP.
12. PROVIDE TMV & SOV TO ESH-EW. TMV ACCESSORY SHALL BE FROM SAME MANUFACTURER AS THE EMERGENCY SHOWER-EYEWASH COMBO. SEE POOL DRAWINGS FOR EMERGENCY SHOWER-EYEWASH COMBO MODEL NUMBER.
13. THE TMV & SOV FOR EMERGENCY EYEWASH IN ACID ROOM SHALL BE INSTALLED IN ADJACENT ROOM AWAY FROM BEING SUBJECTED TO ACID FUMES. TMV ACCESSORY SHALL BE FROM SAME MANUFACTURER AS THE EMERGENCY SHOWER-EYEWASH COMBO. SEE POOL DRAWINGS FOR EMERGENCY SHOWER-EYEWASH COMBO MODEL NUMBER.
14. ANY METALLIC PLUMBING PIPING OR METALLIC SUPPORT COMPONENTS FOR PLUMBING PIPING SHALL BE COATED WITH TNEMEC SERIES COATING TO RESIST CORROSION. PREPARE SURFACE OF METAL PRIOR TO APPLYING PRIME COAT, STRIPE COAT AND FINISH COAT. EXACT COATING AND PROCEDURES SHALL BE PER MANUFACTURER RECOMMENDATIONS.
15. PROVIDE BLDG SHUT OFF VALVE 3FT AFF. ALL FIXTURES INCLUDING HOSE BIBBS AND TRAP PRIMERS IN BUILDING SHALL BE CONNECTED DOWNSTREAM OF THIS SHUT OFF VALVE. ID VALVE AS MAIN SHUT OFF VALVE FOR BUILDING.
16. CLEAN AND FLUSH ALL EXISTING SEWER LINES DOWNSTREAM OF NEW FIXTURES TO THE 6" MAIN SS LINE.
17. PROVIDE INTAKE AND EXHAUST VENT. INSTALL PER BOILER INSTALLATION INSTRUCTIONS AND DETAIL 4/P-501
18. INSTALL PIPING BELOW STEEL FRAME. SEE STRUCTURAL DRAWINGS AND DETAILS FOR MORE INFORMATION. LOCATE PIPING WITHIN 1.5FT HORIZONTALLY FROM FRAMES. COORDIANTE SHOP DRAWINGS AMONGST TRADES PRIOR TO ANY INSTALLATION.
19. PROVIDE LABEL TO LIMIT DISCHARGE FLOW TO NO MORE THAN 50GPM. INCLUDE IN TRAINING IMPORTANCE OF HAVING A CLEAN SEWER SYSTEM DURING BACKWASH.
20. PROVIDE NEW SUMP PUMP ZOELLER 55 115V-1PH-9.7AMPS. PROVIDE NEW BACKWATER VALVE & SOV. CONNECT TO EXISTING PIPE.
21. INCLUDE IN TRAINING IMPORTANCE OF PROPER HANDLING OF ACIDS & OTHER CHEMICALS, IMPORTANCE OF MAINTENANCE OF ALL COMPONENTS, & IMPORTANCE OF REPORTING OF ACID/CHEMICAL LEAKS ONCE OBSERVED. EXHAUST VENTING HAVE BEEN SIZED TO BE ABOVE MINIMUM CODE REQUIREMENTS, HOWEVER ITS EFFECTIVITY TO RESIST ABOVE NORMAL CONCENTRATION OF CHEMICALS IS NOT LIMITLESS. FUMES FROM LEAKING ACID, OR ACID SPILLAGE SHOULD BE PROPERLY & IMMEDIATELY ADDRESSED TO AVOID CREATION AND/OR EXACERBATION OF AN ENVIRONMENT DETRIMENTAL TO PEOPLE'S HEALTH, OR TO BUILDING COMPONENTS WITHIN THE CHEMICAL ROOM, OR IN CLOSE PROXIMITY TO THE CHEMICAL ROOMS.

ADD01

PLUMBING SHEET NOTES:

1. ALL WORK FOR THE REMOVAL OF HAZARDOUS MATERIALS SHALL BE FULLY COORDINATED BETWEEN THE CONTRACTOR AND THE OWNER. THE ARCHITECT AND ENGINEERS THAT HAVE CREATED THE DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT ARE NOT RESPONSIBLE FOR SPECIFYING REQUIREMENTS FOR, OR CONSTRUCTION OBSERVATION OF, HAZARDOUS MATERIAL REMOVAL. THE OWNER SHALL PROVIDE SEPARATE DOCUMENTS REQUIRED FOR HAZARDOUS MATERIAL REMOVAL AND SEPARATE CONSTRUCTION OBSERVATION OF HAZARDOUS MATERIAL REMOVAL. CONTACT OWNER FOR MORE INFORMATION
2. ANY MATERIAL REQUIRED FOR WORK NOT READILY AVAILABLE FOR PURCHASE SHALL HAVE LEAD TIME INDICATED ON THE BID AND ON THE SUBMITTALS. SUCCESSFUL PROCUREMENT OF ALL MATERIALS REQUIRED FOR THE COMPLETION OF WORK SHALL BE ASCERTAINED BY CONTRACTOR PRIOR TO SCHEDULING OF WORK.
3. ALL FINISH FLOOR ELEVATIONS (FF) BASED FROM CIVIL GRADING DRAWINGS. PLEASE REFER TO CIVIL DRAWINGS FOR MORE INFORMATION. BFF VALUES ARE ALL BASED FROM FINISH FLOOR ELEVATION INSIDE BUILDING. COORDINATE EXACT ELEVATIONS THRU SHOP DRAWINGS AND AT SITE.
4. EXISTING PLUMBING LAYOUT ARE BASED FROM AVAILABLE RECORD DRAWINGS OF UNKNOWN ACCURACY. ACTUAL CONDITIONS MAY BE DIFFERENT ESPECIALLY FOR THOSE WITHIN CONCEALED SPACES AND/OR UNDERGROUND. CONTRACTOR SHALL INVESTIGATE EXISTING PIPE ROUTE, ELEVATION, SIZE AND CONDITION, THRU VISUAL OBSERVATIONS, POT-HOLING, RADAR INSPECTION OR OTHER MEANS NECESSARY TO COMPLETE WORK, WELL AHEAD OF NEW PIPE INSTALLATION. SCHEDULE WORK ACCORDINGLY TO PROVIDE ENOUGH TIME TO FIND SOLUTIONS SHOULD VERIFIED INFORMATION BE DIFFERENT FROM HEREWITH. REFLECT ALL FINDINGS ON SHOP DRAWINGS FOR COORDINATION AMONGST TRADES, AND ON AS-BUILT DRAWINGS.
5. SEE PREVIOUS AS-BUILT DRAWINGS FOR CONTINUATION OF EXISTING PLUMBING UTILITIES OUTSIDE OF THIS PROJECT'S SCOPE FOR REFERENCE.
6. FOR CONNECTIONS TO EXISTING PIPE FOUND SMALLER THAN WHAT IS SHOWN ON PLANS, FIELD VERIFY TO LOCATE CLOSEST LARGEST PIPE UPSTREAM FOR SUPPLY PIPING. FOR DRAIN PIPING, FIELD VERIFY TO LOCATE CLOSEST LARGEST PIPE OF SUFFICIENT DEPTH DOWNSTREAM. REFLECT ON SHOP DRAWINGS FOR COORDINATION AMONGST TRADES.
7. PROVIDE TEMPORARY UTILITIES TO ALL FIXTURES & EQUIPMENT TO REMAIN IN SERVICE DURING CONSTRUCTION PERIOD.
8. COORDINATE CONSTRUCTION WORK AND SCHEDULE OF WORK WITH SCHOOL DISTRICT. CONTRACTOR SHALL INCLUDE IN BID MEANS AND/OR METHODS REQUIRED FOR THE WORK INCLUDING ANY REQUIRED SERVICE SHUT DOWNS, TEMPORARY LINES, ROAD CLOSURES, SPECIAL INSPECTIONS, ETC. TO ACCOMPLISH SCOPE. SCHEDULING OF WORK SHALL BE AMICABLE BETWEEN OWNER AND CONTRACTOR.
9. CONTRACTOR SHALL FOLLOW GENERAL PIPE ROUTE AND VALVE LOCATIONS, AND GENERAL ORDER OF SYSTEM COMPONENTS SHOWN ON PLANS. ADJUST PIPE ELEVATIONS OR ROUTING TO AVOID STRUCTURAL COMPONENTS & OTHER BUILDING COMPONENTS WHEN POSSIBLE. IF NECESSARY & ONCE AMICABLE BETWEEN TRADES. COORDINATE ALL SHOP DRAWINGS AMONGST TRADES PRIOR TO ANY PIPE FABRICATION OR INSTALLATION.
10. CONTRACTOR SHALL PREPARE AND MAINTAIN AS-BUILT DRAWINGS OF ALL PLUMBING SYSTEMS AS INSTALLED AT THE JOB SITE, DRAWN BY CONTRACTOR OVER THE DESIGN PLANS. THEY SHALL BE READILY AVAILABLE TO VIEW & INSPECT UPON REQUEST BY PROJECT INSPECTOR, ENGINEER OR OWNER. AS-BUILTS SHALL CLEARLY SHOW CHANGES, REVISIONS, CLARIFICATIONS & SUBSTITUTIONS INSTALLED IN THE PROJECT INCLUDING BUT NOT LIMITED TO: EXACT PIPE ROUTE ESPECIALLY THOSE CONCEALED AND/OR UNDERGROUND, UNDERGROUND PIPE ELEVATIONS, PIPE SIZES, DIMENSIONS FROM WALLS/GRID LINES OF ANY REROUTED PIPE. RFI/CCD/ASI TAG AS REFERENCE TO WHERE CHANGES OCCURRED FROM IF ANY, AND ANY INFORMATION THAT MAY CLARIFY HOW SYSTEMS & COMPONENTS HAD BEEN INSTALLED OR HOW IT DIFFERS FROM ORIGINAL DESIGN PLANS. REFERENCE TO AN RFI/CCD/ASI ALONE SHALL NOT CONSTITUTE COMPLETE AS-BUILT DRAWINGS. AS-BUILT DRAWINGS SHALL BE IN HARD COPY AND DIGITAL (PDF) FORMAT. AS-BUILTS AND QUALITY OF SUCH ARE CRITICAL REQUIREMENTS FOR MAINTENANCE UPKEEP AND FOR USE AS BASIS FOR POSSIBLE FUTURE CONSTRUCTION IMPROVEMENTS. FUTURE DESIGNER/CONTRACTOR WOULD RELY ON. CONTRACTOR SHALL PROVIDE "AS-BUILT" TAG AND CONTRACTOR INFORMATION ON ALL AS-BUILT SHEETS.
11. CONNECT WASTE, VENT & COLD WATER LINES TO ALL NEW FIXTURES. SEE FIXTURE SCHEDULE FOR BRANCH AND FIXTURE OUTLET/INLET CONNECTION SIZES.
12. HORIZONTAL DRAINAGE PIPING SHALL BE RUN IN PRACTICAL ALIGNMENT AND A UNIFORM SLOPE OF NOT LESS THAN 2% TOWARD THE POINT OF DISPOSAL UNLESS IMPRACTICAL DUE TO BUILDING'S STRUCTURAL FEATURES, OR IF CONNECTING TO EXISTING PIPE AT ITS EXISTING UPSTREAM/DOWNSTREAM DEPTH IS IMPOSSIBLE WITHOUT SLOPING LESS THAN 2%. IN SUCH CONDITIONS, PIPE CAN BE SLOPED AT NO LESS THAN 1%. COORDINATE SHOP DRAWINGS AMONGST TRADES PRIOR TO FABRICATION AND INSTALLATION THEN REFLECT ALL CHANGES ON THE AS-BUILT DRAWINGS.
13. COORDINATE ALL CONNECTION POINTS AMONGST TRADES AT SITE PRIOR TO FABRICATION OR INSTALLATION.
14. UNLESS INSIDE UTILITY ROOMS, ALL OVERHEAD PIPING INSIDE ROOM WITH AN EXPOSED CEILING SHALL HAVE THE PIPING INSTALLED AS HIGH AS POSSIBLE. FULLY COORDINATE AMONGST TRADES.
15. ALL PUMPED CONDENSATE DRAIN LINES (PCD) SHALL SLOPE AND DISCHARGE DOWN TO A GRAVITY CD BY A MINIMUM OF 6" TO AVOID BACKFLOW TO MECH UNIT.
16. SEDIMENT TRAPS ON A GAS CONNECTION SHALL BE INSTALLED AS ILLUSTRATED ON CPC FIGURE 1212.9 OF THE 2022 CPC. INCOMING GAS FLOW SHALL ALWAYS COME FROM THE TOP TO ALLOW SEDIMENTS SETTLE IN DOWN IN THE TRAP. A TEE BEFORE TRAP SHALL SERVE AS THE BRANCH CONNECTING TO THE APPLIANCE.
17. ALL VALVES ABOVE CEILING, ACCESSIBLE THRU ACCESS PANELS WITH AN OPENING OF NO MORE THAN 14"X14", SHALL BE WITHIN ARMS REACH FROM THE ACCESS PANEL OPENING.
18. PRIME AND PAINT ALL EXPOSED PIPING TO MATCH ARCHITECTURAL FINISH. KEEP PAINT OFF OF TAGS AND MARKS IDENTIFYING SYSTEM, SIZE, MODEL OR OTHER IMPORTANT INFORMATION.
19. PROTECT ALL INSTALLED DRAINS, DRAIN STRAINERS, EQUIPMENT COMPONENTS, FIXTURES ESPECIALLY THOSE WITH STAINLESS STEEL SURFACES FROM DAMAGE. PLUMBING SYSTEM SHALL BE CLEAN, UNDAMAGED, WORKING AND IN NEW CONDITION UP TO HAND OFF TO OWNER. SEE SPECIFICATIONS FOR MORE INFORMATION ON CLOSING DOC
20. NO EXPOSED PIPING SHALL BE LEFT TO RUST OR SUBJECTED TO CONDITIONS DETRIMENTAL TO THE PIPE WITHOUT PROVIDING PROTECTION, TEMPORARY OR OTHERWISE, SUITABLE FOR THE TYPE OF PIPE BEING PROTECTED.
21. CLOSELY COORDINATE PENETRATIONS THRU STRUCTURAL MEMBERS AMONGST TRADES AT THE SITE THRU SHOP DRAWINGS PRIOR TO CONSTRUCTION. PENETRATION THRU CONCRETE FOUNDATION SHALL BE PROPERLY SLEEVED WHEN REQUIRED. COORDINATE DROPPING FOOTING IF REQUIRED. ALL NOTCHES AND HOLES SHALL BE NEATLY BORED. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
22. THERE SHALL BE NO PIPING WITHIN ELECTRICAL EQUIPMENT'S DEDICATED SPACE. ELECTRICAL EQUIPMENT SUCH AS PANEL BOARDS, SWITCHBOARDS AND MOTOR CONTROL CENTERS LOCATED INDOORS MUST HAVE EXCLUSIVE DEDICATED SPACE FROM THE FLOOR UPWARD TO 6FT ABOVE THE EQUIPMENT, THE WIDTH AND DEPTH OF THE EQUIPMENT. COORDINATE SHOP DRAWINGS AMONGST TRADES LOCATING ALL ELECTRICAL EQUIPMENT PRIOR TO ANY PIPE INSTALLATION. THERE SHALL ALSO BE NO PIPING ABOVE THE DEDICATED SPACE UNLESS PROTECTION IS PROVIDED FOR EQUIPMENT SHOULD THE PIPING LEAK OR BREAK.
23. CONTRACTOR TO AVOID GROUNDING ELECTRICAL HARDWARES SUCH AS TELEPHONES TO AVAILABLE WATER LINES, WHEN POSSIBLE TO AVOID METALLIC TASTE IN WATER FROM DRINKING FOUNTAINS.

KEYPLAN

LIONÄKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com

CONSULTANT

capital engineering
RANCHO CORDOVA, CALIFORNIA
MB - JV PM - DESIGN TEAM
232142.00 PROJECT NO.

FOR REVIEW ONLY / NOT FOR CONSTRUCTION

THE CONSTRUCTION DOCUMENTS HAVE NOT BEEN APPROVED BY THE ENFORCEMENT AGENCY AND ARE NOT COMPLETE OR READY FOR CONSTRUCTION. ELEMENTS, MEMBERS, SYSTEMS AND ASSOCIATED DETAILS AND SPECIFICATIONS MAY NOT BE SHOWN OR FULLY DEVELOPED. FOR BIDDING/ESTIMATING PURPOSES, UTILIZE ADDITIONAL MATERIALS AND QUANTITIES TO ACCOUNT FOR THOSE ITEMS NOT SHOWN OR FULLY DEVELOPED.

SEAL

DATE SIGNED 2024-04-29

PROJECT
JOHN F KENNEDY HIGH SCHOOL SWIMMING POOL UPGRADE

6715 GLORIA DR
SACRAMENTO, CA 95831

CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

MARK	DATE	DESCRIPTION
ADD01	05/13/2024	ADDENDUM#01

MANAGEMENT

LIONAKIS PROJECT NO:	023264
CLIENT PROJECT NO:	
COPYRIGHT:	LIONAKIS 2017

TITLE
ENLARGED PLUMBING DEMO & CONSTRUCTION PLAN

SHEET
P-411

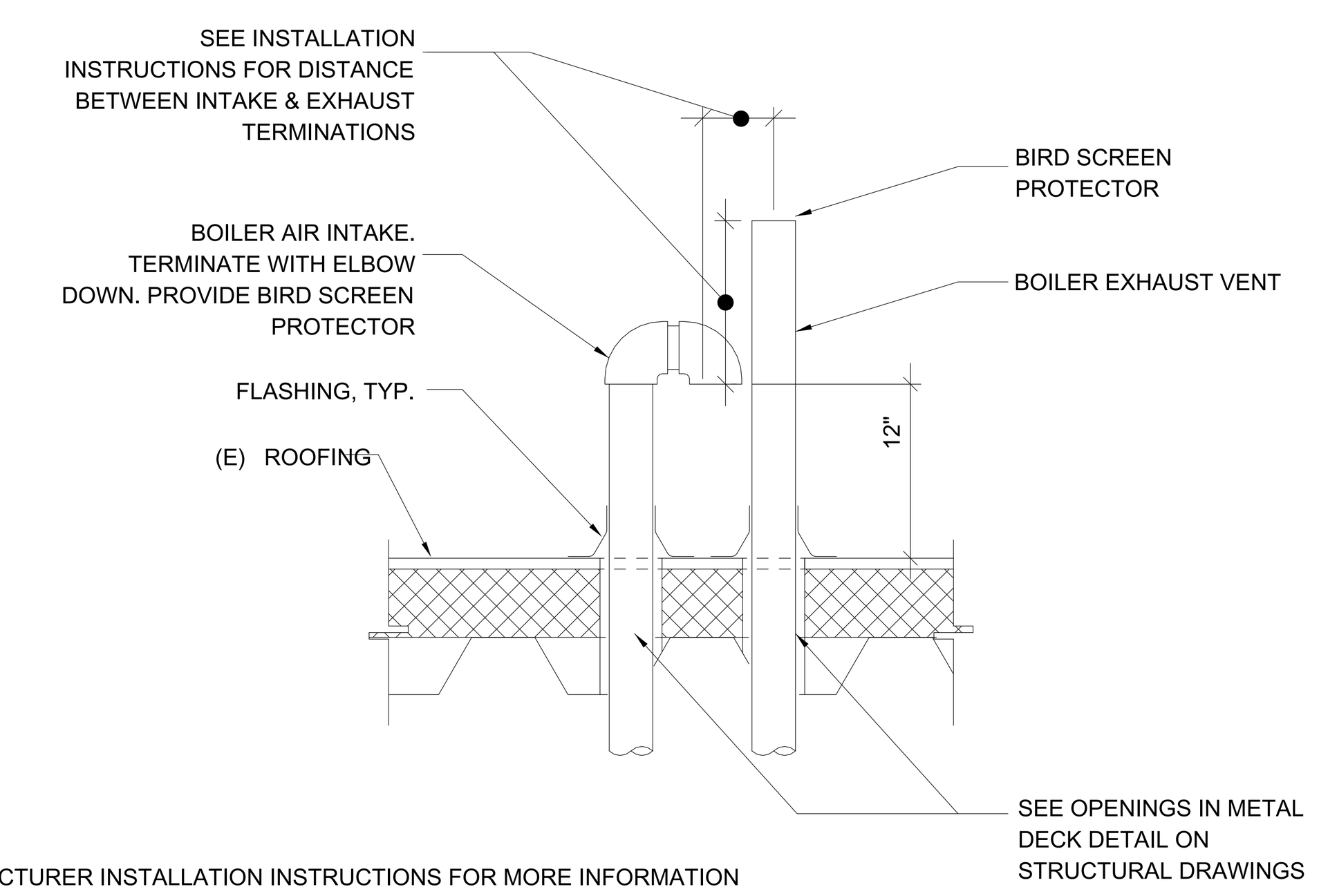
IF THIS SHEET IS NOT 30"x42", IT IS A REDUCED PRINT. SCALE ACCORDINGLY

0 1/4" 1"

Autodesk Docs://023264 SCUSD UPKNS Pool Upgrades/023264_MECHMSTR_R24_CENTRAL.rvt

5/13/2024 4:02:13 PM

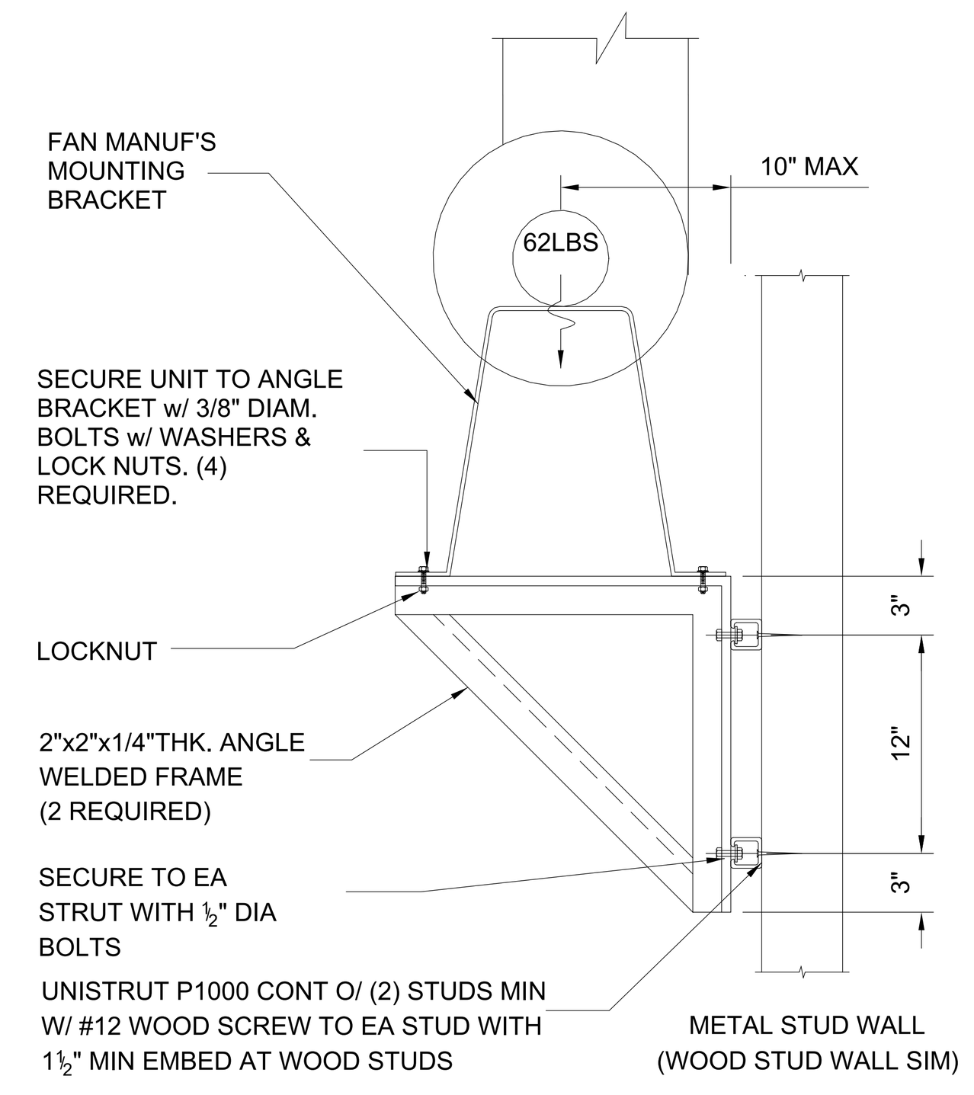
1 2 3 4 5



SEE MANUFACTURER INSTALLATION INSTRUCTIONS FOR MORE INFORMATION

BOILER INTAKE/FLUE THRU ROOF
4 P-501

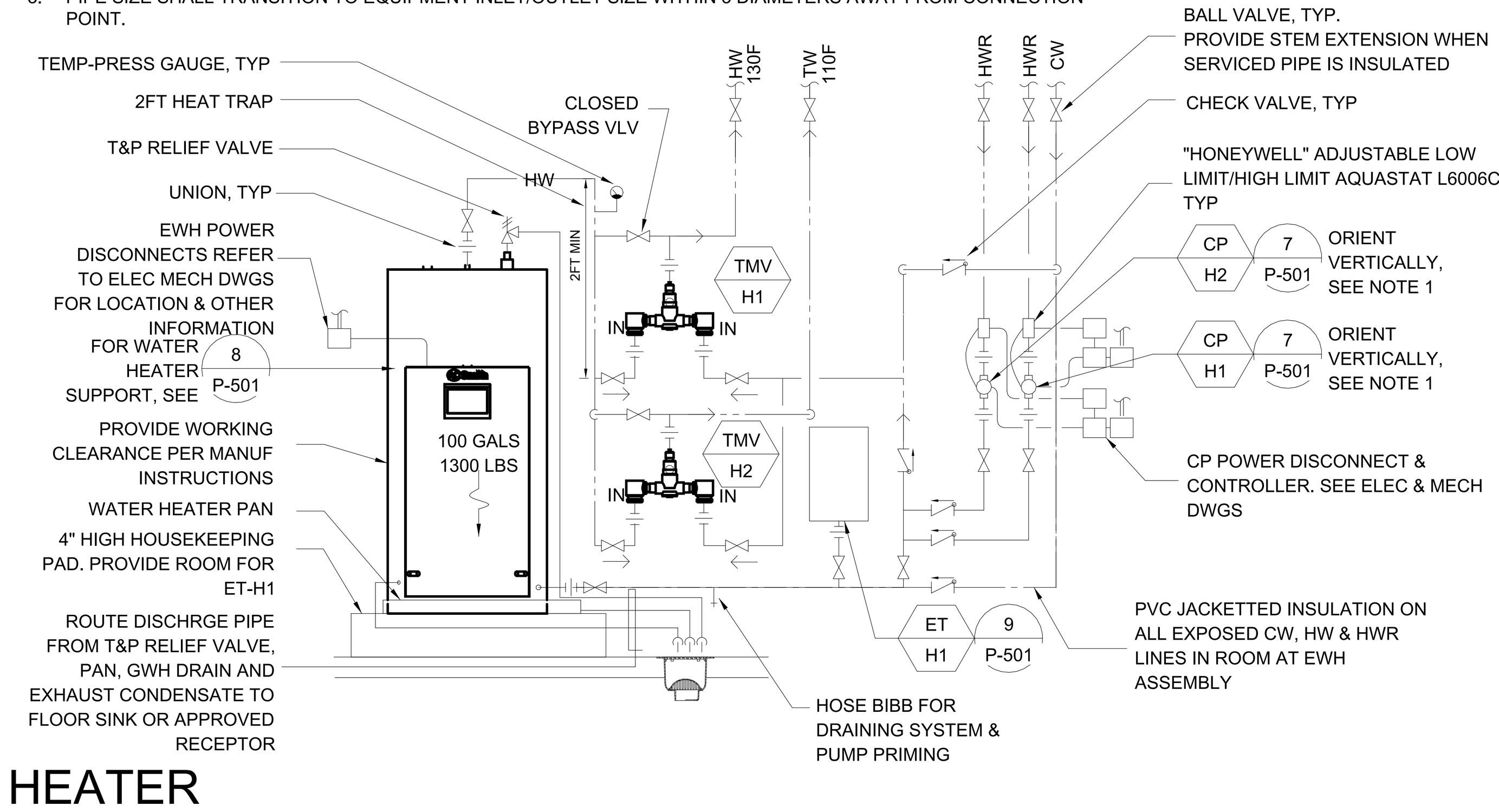
SCALE : NONE



CHEM EXHAUST FAN MOUNTING
3 P-501

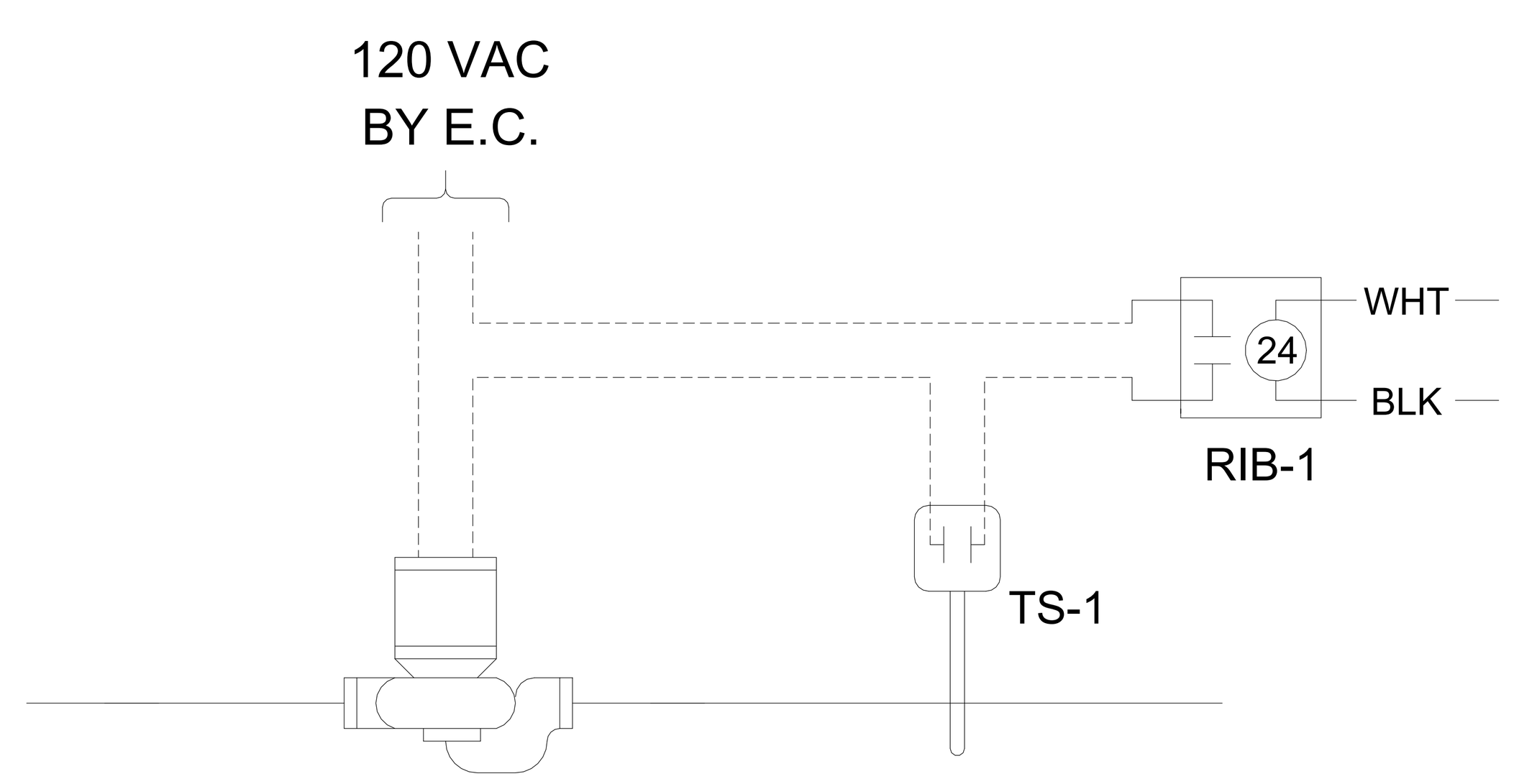
SCALE : NONE

NOTES:
1. PROVIDE AIR RELEASE VALVE WITHIN 4FT UPSTREAM OF CP INLET IF CP IS INSTALLED HORIZONTALLY.
2. SEE PRODUCT SHEETS AND INSTALLATION INSTRUCTIONS FOR EXACT DIMENSIONS AND INLET/OUTLET LOCATIONS.
3. PIPE SIZE SHALL TRANSITION TO EQUIPMENT INLET/OUTLET SIZE WITHIN 3 DIAMETERS AWAY FROM CONNECTION POINT.



ELECTRIC WATER HEATER
1 P-501

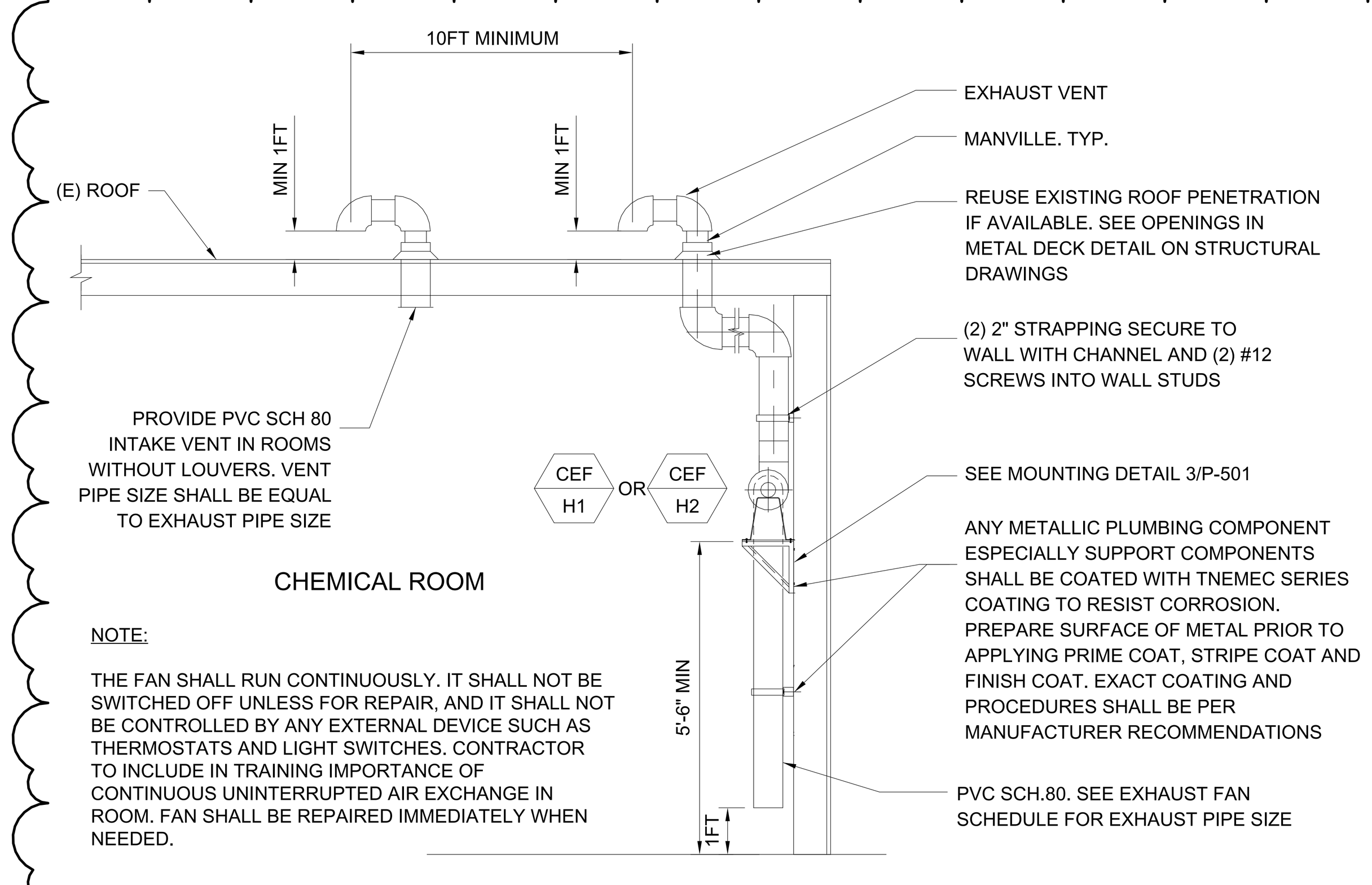
SCALE : NONE



1. CIRCULATING PUMP SHALL RUN DURING OCCUPIED HOURS, SCHEDULED BY PROGRAMABLE TIMECLOCK.
2. SET AQUASTAT TO SHUT OFF PUMP WHEN RETURN WATER TEMPERATURE REACHES TMV SETPOINT. SET PUMP TO ON WHEN 5F BELOW TMV SETPOINT.
3. SEE PLUMBING PLANS FOR LOCATION.

DHW CIRCULATING PUMP CONTROL DIAGRAM
7 P-501

SCALE : NONE



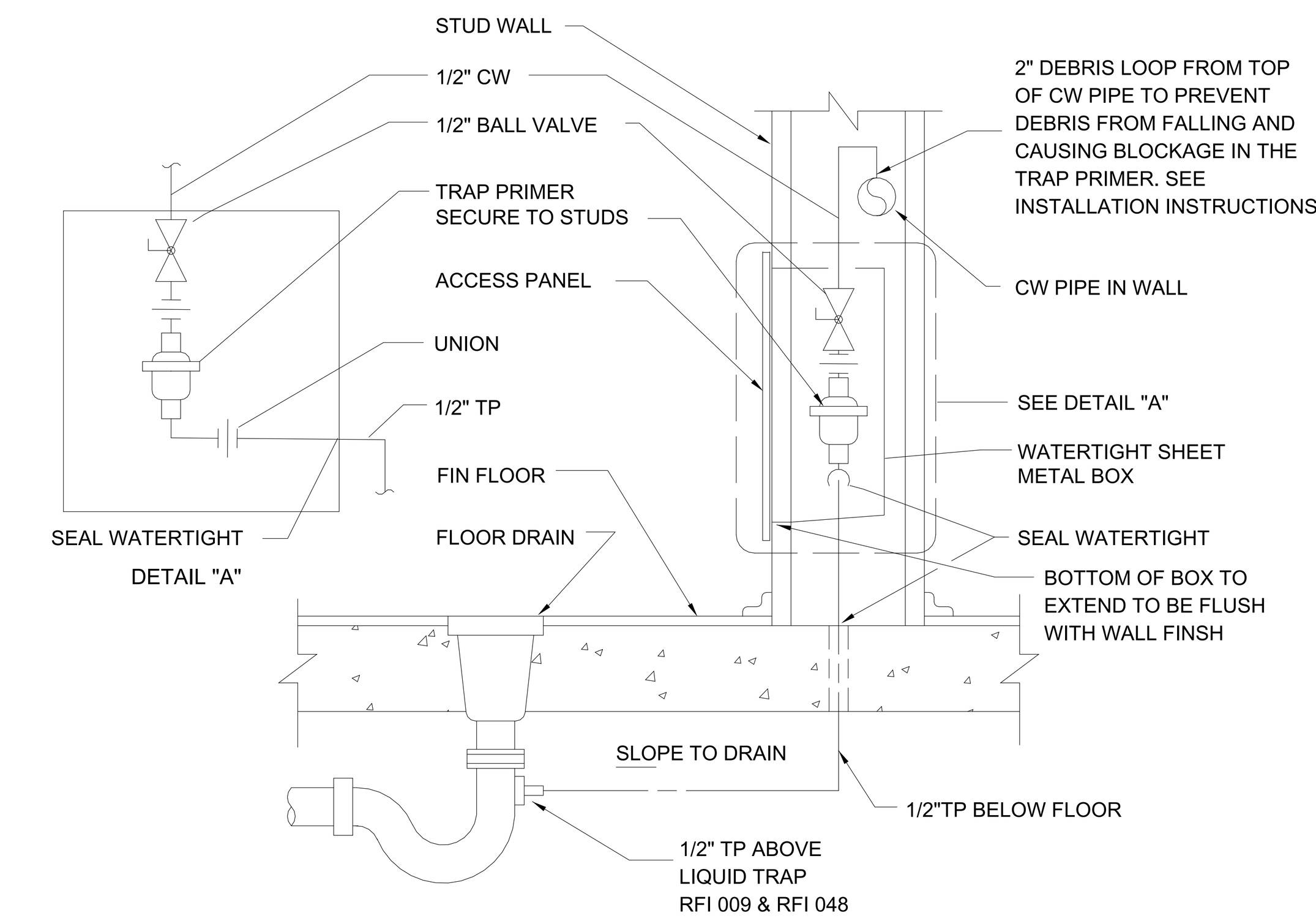
NOTE:

THE FAN SHALL RUN CONTINUOUSLY. IT SHALL NOT BE SWITCHED OFF UNLESS FOR REPAIR, AND IT SHALL NOT BE CONTROLLED BY ANY EXTERNAL DEVICE SUCH AS THERMOSTATS AND LIGHT SWITCHES. CONTRACTOR TO INCLUDE IN TRAINING IMPORTANCE OF CONTINUOUS UNINTERRUPTED AIR EXCHANGE IN ROOM. FAN SHALL BE REPAIRED IMMEDIATELY WHEN NEEDED.

EXHAUST FAN DETAIL
6 P-501

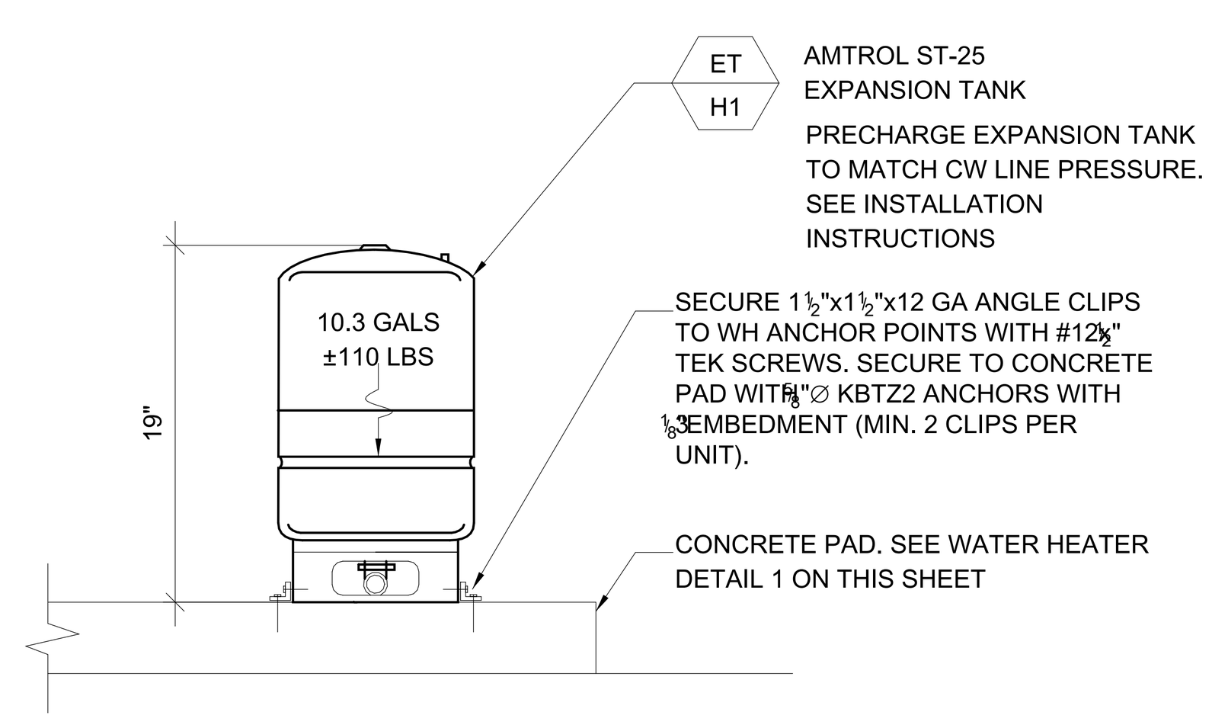
SCALE : NONE

ADD01



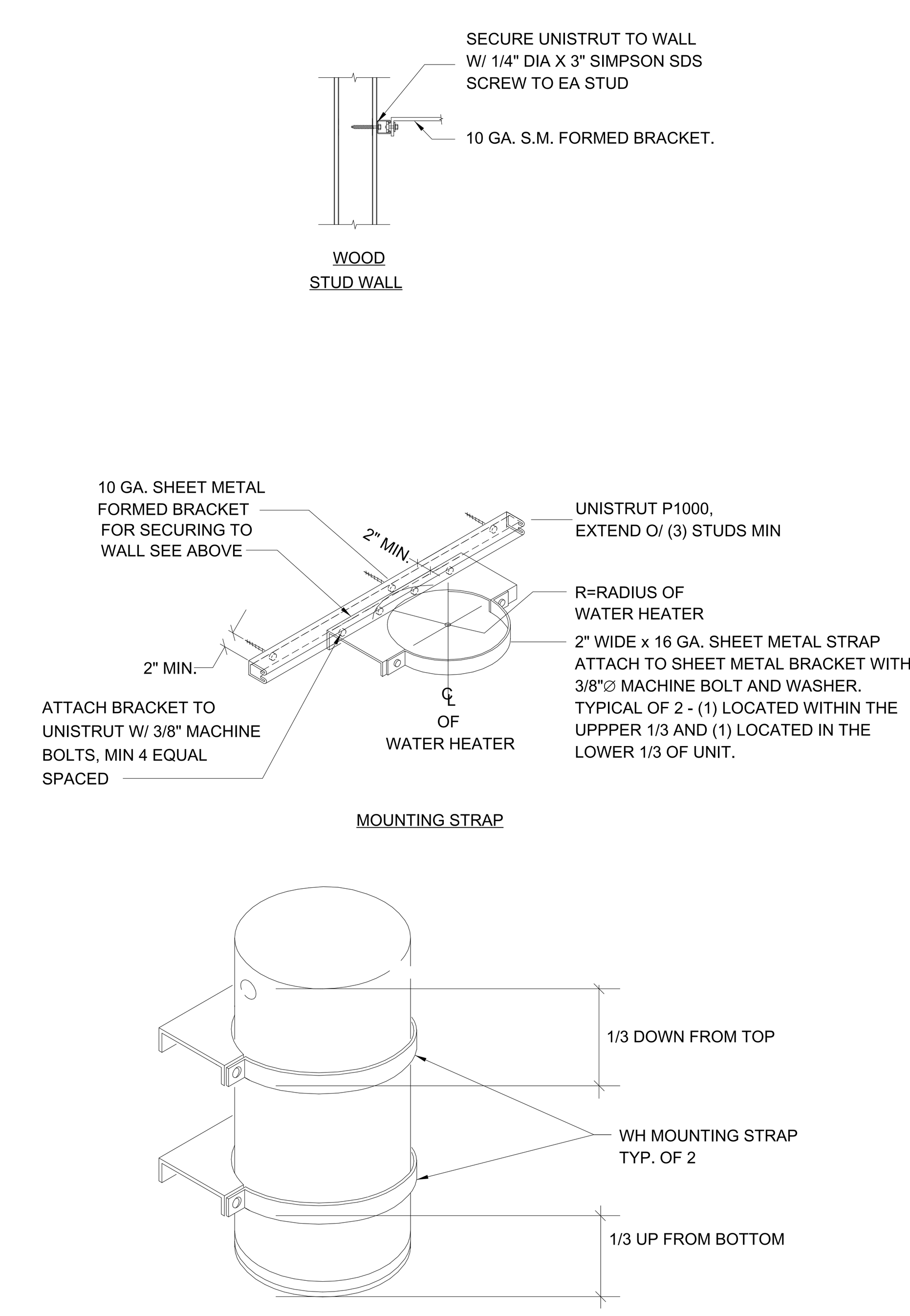
TRAP PRIMER TO FLOOR DRAIN
5 P-501

SCALE : NONE



EXPANSION TANK ANCHORAGE
9 P-501

SCALE : NONE



WATER HEATER SUPPORT
8 P-501

SCALE : NONE

IF THIS SHEET IS NOT 30"x42", IT IS A REDUCED PRINT - SCALE ACCORDINGLY

Autodesk Docs://023264 SCUSD JFKHS Pool Upgrades/023264_MECHMSTR_R24_CENTRAL.rvt

5/13/2024 4:02:15 PM

LIONÄKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com

CONSULTANT

capital engineering
RANCHO CORDOVA, CALIFORNIA
MB - JV | 232142.00
PM - DESIGN TEAM | PROJECT NO.

FOR REVIEW ONLY / NOT FOR CONSTRUCTION
THE CONSTRUCTION DOCUMENTS HAVE NOT BEEN APPROVED BY THE ENFORCEMENT AGENCY AND ARE NOT COMPLETE OR READY FOR CONSTRUCTION. ELEMENTS, MEMBERS, SYSTEMS AND ASSOCIATED DETAILS AND SPECIFICATIONS MAY NOT BE SHOWN OR FULLY DEVELOPED. FOR BIDDING/ESTIMATING PURPOSES, UTILIZE ADDITIONAL MATERIALS AND QUANTITIES TO ACCOUNT FOR THOSE ITEMS NOT SHOWN OR FULLY DEVELOPED.

SEAL

DATE SIGNED 2024-04-29

PROJECT
JOHN F KENNEDY HIGH SCHOOL SWIMMING POOL UPGRADE
6715 GLORIA DR
SACRAMENTO, CA 95831

CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

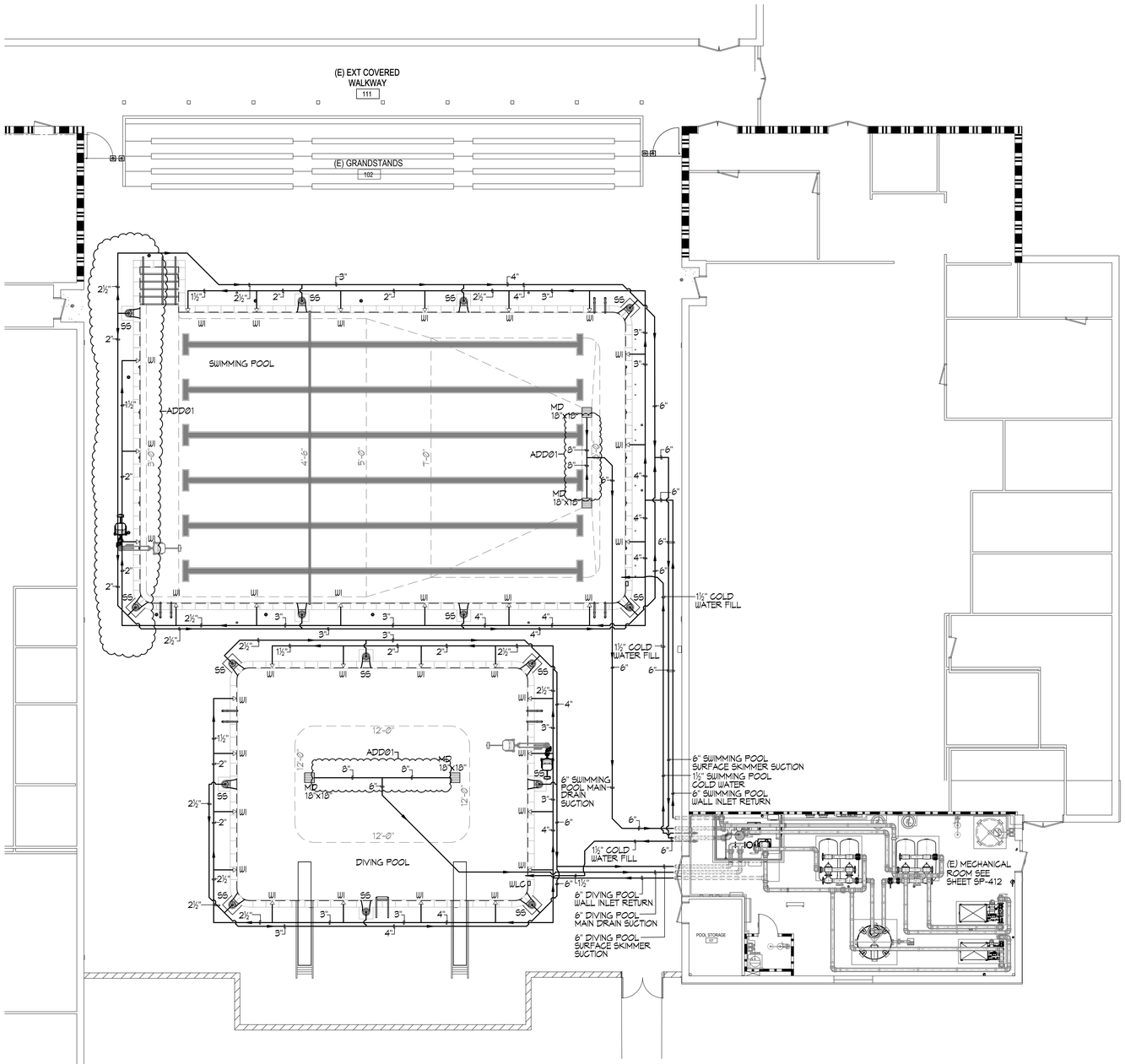
MARK	DATE	DESCRIPTION
ADD01	05/13/2024	ADDENDUM#01

MANAGEMENT

LIONAKIS PROJECT NO:	023264
CLIENT PROJECT NO:	
COPYRIGHT:	LIONAKIS 2017

TITLE
PLUMBING DETAILS

SHEET
P-501



SWIMMING POOL DATA

SURFACE AREA	=	3,417 SQ. FT.
PERIMETER	=	250 FT.
DEPTHS	=	3'-0" TO 8'-0"
VOLUME	=	146,715 GAL.
6 HR TURNOVER	=	407 GPM

DIVING POOL DATA

SURFACE AREA	=	1,616 SQ. FT.
PERIMETER	=	159 FT.
DEPTHS	=	12'-0"
VOLUME	=	145,052 GAL.
6 HR TURNOVER	=	403 GPM

LEGEND

MD	=	MAIN DRAIN — 3 / SP-503, 505
SS	=	SURFACE SKIMMER — 1 / SP-504
WLC	=	WATER LEVEL CONTROLLER — 2 / SP-504
WI	=	WALL INLET — 7 / SP-504

LIONAKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com

CONSULTANT

AQUATIC DESIGN GROUP
2226 Faraday Ave. Carlsbad, CA 92008
AquaticDesignGroup.com
760.438.8400

FOR REVIEW ONLY / NOT FOR CONSTRUCTION
THE CONSTRUCTION DOCUMENTS HAVE NOT BEEN APPROVED BY THE ENFORCEMENT AGENCY AND ARE NOT COMPLETE OR READY FOR CONSTRUCTION. ELEMENTS, MEMBERS, SYSTEMS AND ASSOCIATED DETAILS AND SPECIFICATIONS MAY NOT BE SHOWN OR FULLY DEVELOPED. FOR BIDDING/ESTIMATING PURPOSES, UTILIZE ADDITIONAL MATERIALS AND QUANTITIES TO ACCOUNT FOR THOSE ITEMS NOT SHOWN OR FULLY DEVELOPED.

SEAL

PROJECT
JOHN F KENNEDY HIGH SCHOOL
SWIMMING POOL UPGRADE

6715 GLORIA DR
SACRAMENTO, CA 95831

CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

MARK	DATE	DESCRIPTION

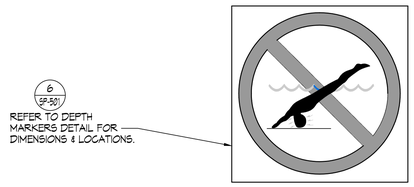
MANAGEMENT

LIONAKIS PROJECT NO:	700007
CLIENT PROJECT NO:	700.00.007
COPYRIGHT:	LIONAKIS 2017

TITLE
SWIMMING POOL / DIVING POOL PIPING PLAN

SHEET
SP-115

1 **SWIMMING POOL / DIVING POOL PIPING PLAN** ⅛"=1'-0"



6 SP-501

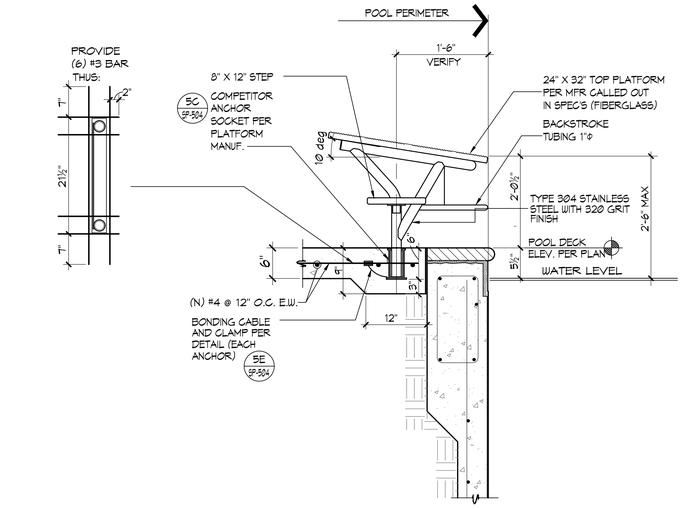
REFER TO DEPTH MARKERS DETAIL FOR DIMENSIONS & LOCATIONS.

NOTE: PLACE IN DECK AT ALL DEPTH MARKER LOCATION OF 6'-0" OR LESS.

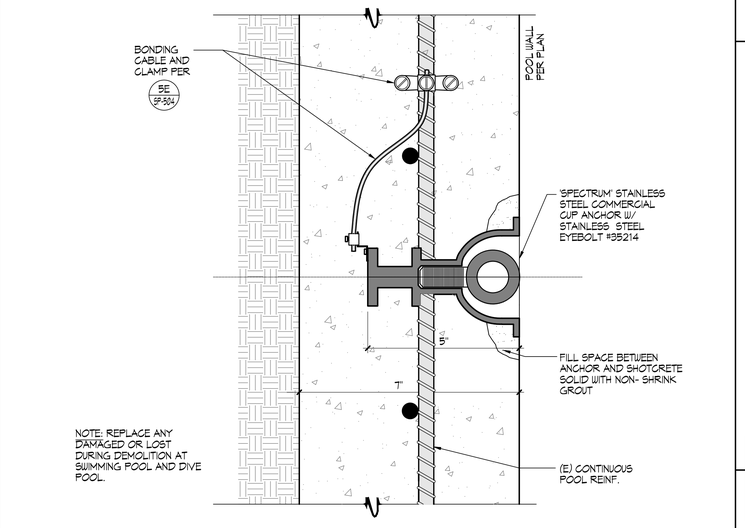
SILK SCREEN

1. INLAYS DOUBLE GLAZED WHITE SLIP RESISTANT TILE TYP. OF (1) PIECE OVER ¼" MORTAR BED WITH ⅛" GROUT JOINTS. SEE PLAN FOR LOCATION.
2. 1" WIDE RED CIRCLE WITH 1" WIDE RED DIAGONAL LINE.
3. ⅛" BLUE WATER.
4. 1/16" RED TICKS ABOUT THE HEAD.
5. TAN COLOR BODY WITH BLACK OUTLINE, HAIR AND TRUNKS.
6. ⅛" BLACK POOL FLOOR.

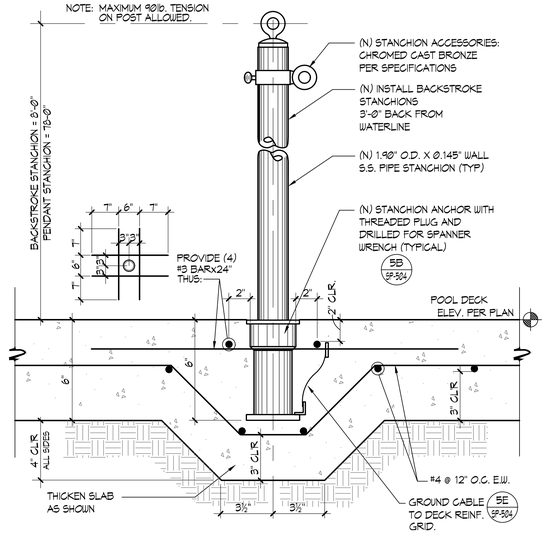
1 INTERNATIONAL "NO DIVING" MARKER 3"=1'-0"



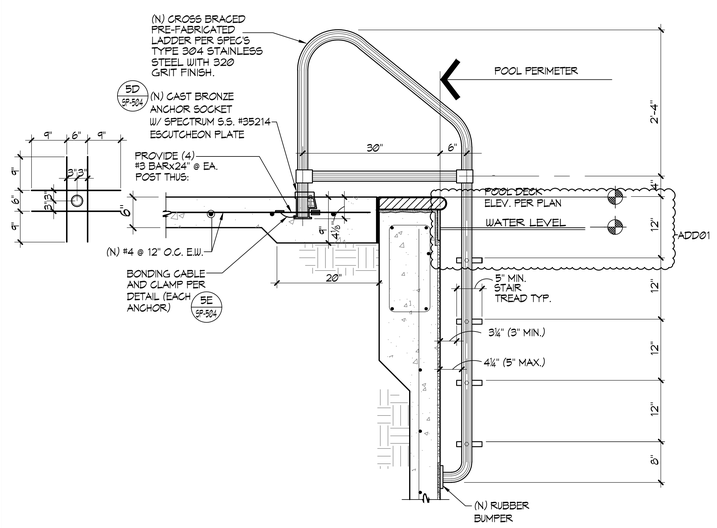
2 (N) RACING PLATFORM 1"=1'-0"



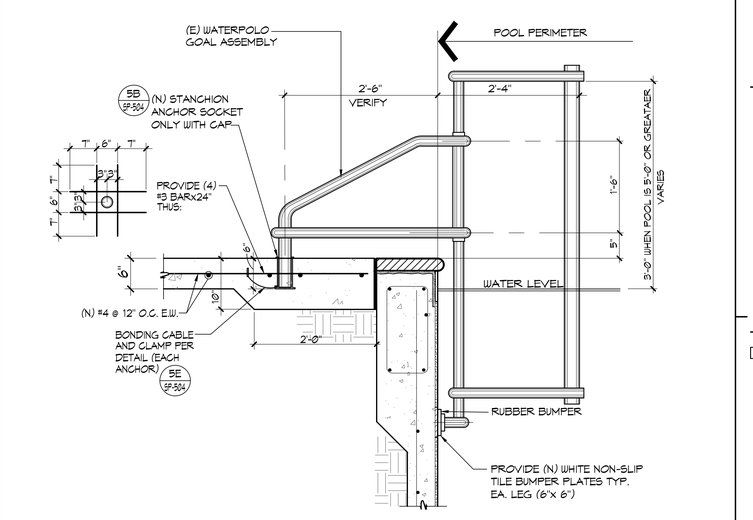
3 (N) OR (E) ROPE ANCHOR ½" = 1"



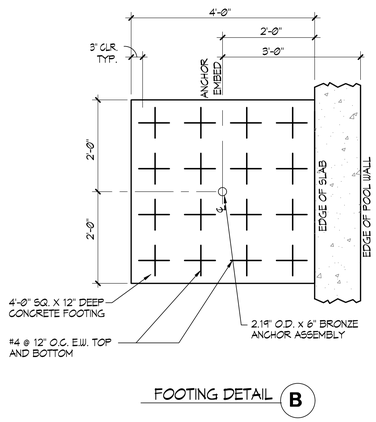
4 (N) STANCHION POST/ANCHOR 3"=1'-0"



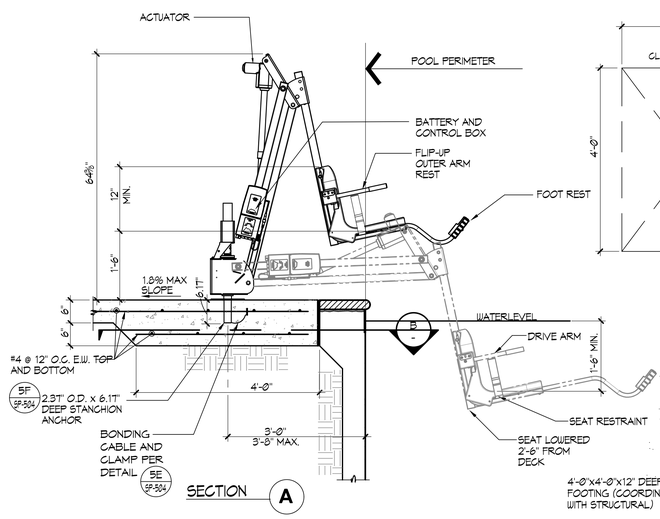
5 (N) DIVING POOL LADDER 1"=1'-0"



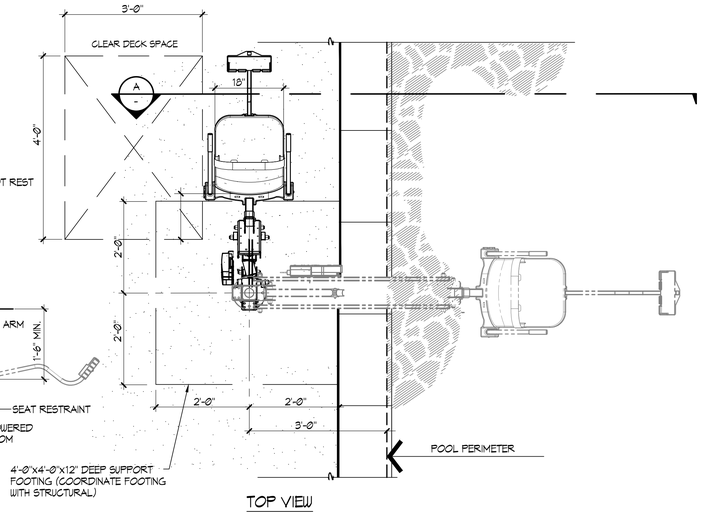
6 (N) SWIMMING POOL WATERPOLO GOAL 1"=1'-0"



FOOTING DETAIL B



SECTION A



TOP VIEW

7 (N) SWIMMING POOL ACCESSIBLE LIFT ¾"=1'-0"

NOTES:

1. 'AQUA CREEK' MIGHTY 400 F-MTY-400 (350 lbs. MIN. LIVE LOAD AND 400 lbs. MAX. LIFTING CAPACITY)
2. GUSSET COVER PLATE TO BE ATTACHED REQUIRING A TOOL FOR REMOVAL.
3. CONTRACTOR SHALL PROVIDE COVER FOR LIFT 'AQUA CREEK'; EXTRA BATTERY PACK 'AQUA CREEK' #F-004AB; AND TRANSPORTER CART 'AQUA CREEK' #F-MTTC.
4. UTILIZE OUTLET IN OFFICE FOR DISABLED LIFT BATTERY CHARGE STATION.
5. POOL LIFT SHALL BE LOCATED WHERE THE WATER LEVEL IS AT LEAST 36" AND DOES NOT EXCEED 48" DEEP , UNLESS ENTIRE POOL IS GREATER THAT 48" DEEP. (CBC SECTION 11B-1009.2.1)
6. ON THE RAISED POSITION, THE CENTERLINE OF THE SEAT SHALL BE LOCATED OVER THE DECK AND 16" MINIMUM FROM THE EDGE OF THE POOL. THE DECK SURFACE BETWEEN THE CENTERLINE OF THE SEAT AND THE POOL EDGE SHALL HAVE A 2% MAX. SLOPE. (CBC SECTION 11B-1009.2.2)
7. CLEAR DECK SPACE SHALL BE PROVIDED ON SIDE OF SEAT OPPOSITE THE WATER PARALLEL TO THE WATER 36" WIDE X 48" MINIMUM FROM A LINE LOCATED 12" BEHIND THE REAR EDGE OF THE SEAT. THE CLEAR SPACE SHALL HAVE A 2% MAX. SLOPE. (CBC SECTION 11B-1009.2.3)
8. THE HEIGHT OF THE LIFT SEAT SHALL BE DESIGNED TO ALLOW A STOP AT 17" MIN. TO 19" MAX. MEASURED FROM THE DECK TO THE TOP OF THE SEAT SURFACE WHEN IN THE RAISED POSITION. (CBC SECTION 11B-1009.2.4)
9. THE SEAT SHALL BE RIGID AND 17" MIN. TO 19" MAX. WIDE. THE LIFT SEAT SHALL HAVE A BACK SUPPORT 12" MIN. TALL. (CBC SECTION 11B-1009.2.4)
10. FOOTRESTS SHALL BE PROVIDED, EXCEPT FOR SPA LIFTS, AND SHALL MOVE WITH THE SEAT. LIFT SHALL HAVE TWO ARMRESTS. THE ARMREST POSITIONED OPPOSITE THE WATER SHALL BE REMOVABLE OR SHALL FOLD CLEAR OF THE SEAT WHEN THE SEAT IS IN THE RAISED POSITION. (CBC SECTION 11B-1009.2.6)
11. THE LIFT SHALL BE CAPABLE OF UNASSISTED OPERATION FROM BOTH THE DECK AND WATER LEVELS. CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL BE UNOBSTRUCTED WHEN THE LIFT IS IN USE (CBC SECTION 11B-309.4). LIFT MUST BE STABLE AND NOT PERMIT UNINTENDED MOVEMENT WHEN A PERSON IS GETTING INTO OR OUT OF THE SEAT. (CBC SECTION 11B-1009.2.7)
12. THE LIFT SHALL BE DESIGNED SO THAT THE SEAT WILL SUBMERGE TO A WATER DEPTH OF 18" MIN. BELOW THE STATIONARY WATER LEVEL. (CBC SECTION 11B-1009.2.8)
13. LIFT SEAT MUST HAVE AN OCCUPANT RESTRAINT FOR USE BY THE OCCUPANT OF THE SEAT AND THE RESTRAINT MUST MEET THE STANDARDS FOR OPERABLE CONTROLS IN COMPLIANCE WITH CBC SECTION 11B-1009.2.4 AND SECTION 11B-309.

LIONÄKIS
2025 Nineteenth Street
Sacramento CA 95818
P 916.558.1900
www.lionakis.com

CONSULTANT

AQUATIC DESIGN GROUP
2226 Faraday Ave. Carlsbad, CA 92008
AquaticDesignGroup.com
760.438.8400

FOR REVIEW ONLY / NOT FOR CONSTRUCTION
THE CONSTRUCTION DOCUMENTS HAVE NOT BEEN APPROVED BY THE ENFORCEMENT AGENCY AND ARE NOT COMPLETE OR READY FOR CONSTRUCTION. ELEMENTS, MEMBERS, SYSTEMS AND ASSOCIATED DETAILS AND SPECIFICATIONS MAY NOT BE SHOWN OR FULLY DEVELOPED. FOR BIDDING/ESTIMATING PURPOSES, UTILIZE ADDITIONAL MATERIALS AND QUANTITIES TO ACCOUNT FOR THOSE ITEMS NOT SHOWN OR FULLY DEVELOPED.

SEAL

LICENSED ARCHITECT GREGORY S. REBER C-35802 REN. 07/31/26 STATE OF CALIFORNIA

PROJECT
JOHN F KENNEDY HIGH SCHOOL SWIMMING POOL UPGRADE

6715 GLORIA DR
SACRAMENTO, CA 95831

CLIENT
SACRAMENTO CITY UNIFIED SCHOOL DISTRICT

ISSUED

MARK	DATE	DESCRIPTION

MANAGEMENT

LIONAKIS PROJECT NO:	700002
CLIENT PROJECT NO:	700.00.007
COPYRIGHT:	LIONAKIS 2017

TITLE
DETAILS

SHEET
SP-502

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Balancing Air Systems:
   a. Constant-volume air systems.
   b. Dual-duct systems.

2. Balancing Domestic Water Piping Systems.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.03 REFERENCES AND STANDARDS

A. Associated Air Balance Council (AABC)

1. National Standards for Total System Balance, latest edition.

B. National Environmental Balancing Bureau (NEBB)

1. Procedural Standards for Testing and Balancing of Environmental Systems, latest edition.

1.04 DEFINITIONS

A. The intent of this Section is to use the standards pertaining to the TAB specialist engaged to perform the Work of this Contract, with additional requirements specified in this Section. Contract requirements take precedence over corresponding AABC or NEBB standards requirements. Differences in terminology between the Specifications and the specified TAB organization standards do not relieve the TAB entity engaged to perform the Work of this Contract of responsibility from completing the Work as described in the Specifications.

B. Similar Terms: The following table is provided for clarification only:

Similar Terms		
Contract Term	AABC Term	NEBB Term
TAB Specialist	TAB Agency	NEBB Certified Firm
TAB Standard	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems	Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems
TAB Field Supervisor	Test and Balance Engineer	Test and Balance Supervisor

C. AABC: Associated Air Balance Council.

D. NEBB: National Environmental Balancing Bureau.

E. TAB: Testing, adjusting, and balancing.

F. TAB Organization: Body governing practices of TAB Specialists.

G. TAB Specialist: An entity engaged to perform TAB Work.

1.05 ACTION SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. LEED Submittals:

1.06 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

1. Provide list of similar projects completed by proposed TAB field supervisor.
2. Provide copy of completed TAB report, approved by mechanical engineer of record for a completed project with similar system types and of similar complexity.

C. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

1. Submit examinations report with qualifications data.

D. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

E. Interim Reports. Submit interim reports as specified in Part 3. Include list of system conditions requiring correction and problems not identified in Contract Documents examination report.

F. Certified TAB reports.

1. Provide three printed copies of final TAB report. Provide one electronic file copy in PDF format.

G. Sample report forms.

H. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.
   a. Instruments to be used for testing and balancing shall have been calibrated within a period of one year, or less if so recommended by instrument manufacturer and be checked for accuracy prior to start of work.

1.07 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Certified TAB reports, for inclusion in Operation and Maintenance Manual.

1.08 QUALITY ASSURANCE

A. Independent TAB Specialist Qualifications: Engage a TAB entity certified by AABC or NEBB.

1. The certification shall be maintained for the entire duration of TAB work for this Project. If TAB specialist loses certification during this period, the Contractor shall immediately notify the Architect and submit another TAB specialist for approval. All work specified in this Section and in other related Sections performed by the TAB specialist shall be invalidated if the TAB specialist loses certification, and shall be performed by an approved successor.

B. To secure approval for the proposed TAB specialist, submit information certifying that the TAB specialist is either a first tier subcontractor engaged and paid by the Contractor, or is engaged and paid directly by the Owner. TAB specialist shall not be affiliated with any other entity participating in Work of this Contract, including design, furnishing equipment, or construction. In addition, submit evidence of the following:

1. TAB Field Supervisor: Full-time employee of the TAB specialist and certified by AABC or NEBB.
   a. TAB field supervisor shall have minimum 10 years supervisory experience in TAB work.

2. TAB Technician: Full-time employee of the TAB specialist and who is certified by AABC or NEBB as a TAB technician.
   a. TAB technician shall have minimum 4 years TAB field experience.

C. TAB Specialist engaged to perform TAB work in this Project shall be a business limited to and specializing in TAB work, or in TAB work and Commissioning.

D. TAB specialist engaged to perform TAB work shall not also perform commissioning activities on this Project.

E. Certified TAB field supervisor or certified TAB technician shall be present at the Project site at all times when TAB work is performed.

1. TAB specialist shall maintain at the Project site a minimum ratio of one certified field supervisor or technician for each non-certified employee at times when TAB work is being performed.

F. Contractor shall notify Architect in writing within three days of receiving direction resulting in reduction of test and balance scope or other deviations from Contract Documents. Deviations from the TAB plan shall be approved in writing by the mechanical engineer of record for the Project.

G. TAB Standard:

1. Perform TAB work in accordance with the requirements of the standard under which the TAB agencies' qualifications are approved unless Specifications contain different or more stringent requirements:
   a. AABC National Standards for Total System Balance, or
   b. NEBB Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.

2. All recommendations and suggested practices contained in the TAB standard are mandatory. Use provisions of the TAB standard, including checklists and report forms, to the extent to which they are applicable to this Project.
3. Testing, adjusting, balancing procedures, and reporting required for this Project, and not covered by the TAB standard applicable to the TAB specialist engaged to perform the Work of this Contract, shall be submitted for approval by the design engineer.

H. TAB Conference: Meet with Architect and mechanical engineer on approval of the TAB strategies and procedures plan to develop a mutual understanding of the project requirements. Require the participation of the TAB field supervisor. Provide seven days' advance notice of scheduled meeting time and location. TAB conference shall take place at location selected by Architect offices of Capital.

1. Agenda Items:
   a. The Contract Documents examination report.
   b. The TAB plan.
   c. Coordination and cooperation of trades and subcontractors.
   d. Coordination of documentation and communication flow, including protocol for resolution tracking and documentation.

2. The requirement for TAB conference may be waived at the discretion of the mechanical engineer of record for the Project.

I. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

J. TAB Report Forms: Use standard TAB specialist's forms approved by Architect .

K. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.09 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.10 WARRANTY

A. Provide workmanship and performance warranty applicable to TAB specialist engaged to perform Work of this Contract:

1. AABC Performance Guarantee.
2. NEBB Quality Assurance Program.

B. Refer to Division 01 Specifications for additional requirements.

1.11 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

C. Coordinate TAB work with work of other trades.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contract Documents Examination Report:

1. TAB specialist shall review Contract Documents, including plans and specifications. Provide report listing conditions that would prevent the system(s) from operating in accordance with the sequence of operations specified, or would prevent accurate testing and balancing:
   a. Identify each condition requiring correction using equipment designation shown on Drawings. Provide room number, nearest building grid line intersection, or other information necessary to identify location of condition requiring correction.
   b. Proposed corrective action necessary for proper system operation.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

I. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

J. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.

K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

L. Examine system pumps to ensure absence of entrained air in the suction piping.

M. Examine operating safety interlocks and controls on HVAC equipment.

N. Report conditions requiring correction discovered before and during performance of TAB procedures.

O. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.02 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures. TAB plan shall be specific to Project and include the following:

1. General description of each air system and sequence(s) of operation.
2. Complete list of measurements to be performed.

3. Complete list of measurement procedures. Specify types of instruments to be utilized and method of instrument application.
4. Qualifications of personnel assigned to Project.
5. Single-line CAD drawings reflecting all test locations (terminal units, grilles, diffusers, traverse locations, etc.
6. Air terminal correction factors for the following:
   a. Air terminal configuration.
   b. Flow direction (supply or return/exhaust).
   c. Effective area of each size and type of air terminal.
   d. Air density.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Isolating and balancing valves are open and control valves are operational.
6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.03 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 80 00 Heating, Ventilating, and Air Conditioning."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.04 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Test each system to verify building or space operating pressure, including all stages of economizer cycle. Maximum building pressure shall not exceed 0.03 inches of pressure.

C. Except as specifically indicated in this Specification, Pitot tube traverses shall be made of each duct to measure airflow. Pitot tubes, associated instruments, traverses, and techniques shall conform to ASHRAE Handbook, HVAC Applications, and ASHRAE Handbook, HVAC Systems and Equipment.

1. Use state-of-the-art instrumentation approved by TAB specialists governing agency..
2. Where ducts' design velocity and air quantity are both less than 1000 fpm/CFM, air quantity may be determined by measurements at terminals served.

D. Test holes shall be placed in straight duct, as far as possible downstream from elbow, bends, take-offs, and other turbulence-generating devices.

E. For variable-air-volume systems, develop a plan to simulate diversity.

F. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

G. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

H. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

I. Verify that motor starters are equipped with properly sized thermal protection.

J. Check dampers for proper position to achieve desired airflow path.

K. Check for airflow blockages.

L. Check condensate drains for proper connections and functioning.

M. Check for proper sealing of air-handling-unit components.

N. Verify that air duct system is sealed as specified in Section 23 80 00 "Heating, Ventilating, and Air Conditioning."

O. Provide for adjustments or modifications to fan and motor sheaves, belts, damper linkages, and other components as required to achieve specified air balance at no additional cost to Owner.

P. Automatically operated dampers shall be adjusted to operate as indicated in Contract Documents. Controls shall be checked for proper calibration.

3.05 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.
   a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow. Alternative

methods shall be examined for determining total CFM, i.e., Pitot-tube traversing of branch ducts, coil or filter velocity profiles, prior to utilizing airflow values at terminal outlets and inlets.

2. Measure fan static pressures as follows to determine actual static pressure:
   a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
   b. Measure static pressure directly at the fan outlet.
   c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
   d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
   a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Check operation of relief air dampers. Measure total relief air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust relief air dampers to provide 100 percent relief in economizer mode. Ensure that relief dampers close completely upon unit shutdown.

C. Check operation of outside air dampers. Measure total outside air quantity at each stage of normal, economizer, power exhaust, or power exhaust economizer operation, as applicable to installed equipment. Adjust outside air dampers to provide 100 percent outside air in economizer mode. Ensure that outside air dampers close completely upon unit shutdown.

D. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.
   a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

E. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading digital backflow compensating hood. Use outlet manufacturer's written instructions and calculating factors only when direct-reading hood cannot be used due to physical obstruction or other limiting factors. Final report shall indicate where values listed have not been obtained by direct measurement.

F. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents, if included.
2. Adjust patterns of adjustable outlets for proper distribution without drafts. Terminal air velocity at five feet above finished floor shall not exceed 50 feet per minute in occupied air conditioned spaces.

G. Do not overpressurize ducts.

3.06 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter manufacturer’s name, model number, size, type, and thermal-protection-element rating.
   a. Starter strip heater size, type, and rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.07 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.08 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each electric heating coil:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

B. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.

3.09 PROCEDURES FOR TESTING, ADJUSTING, AND BALANCING EXISTING SYSTEMS

A. Perform a preconstruction inspection of existing equipment that is to remain and be reused.

1. Measure and record the operating speed, airflow, and static pressure of each fan.
2. Measure motor voltage and amperage. Compare the values to motor nameplate information.
3. Check the condition of filters.
4. Check the condition of coils.
5. Check the operation of the drain pan and condensate-drain trap.
6. Check bearings and other lubricated parts for proper lubrication.
7. Report on the operating condition of the equipment and the results of the measurements taken. Report conditions requiring correction.

B. Before performing testing and balancing of existing systems, inspect existing equipment that is to remain and be reused to verify that existing equipment has been cleaned and refurbished. Verify the following:

1. New filters are installed.
2. Coils are clean and fins combed.
3. Drain pans are clean.
4. Fans are clean.
5. Bearings and other parts are properly lubricated.
6. Conditions requiring correction noted in the preconstruction report are corrected.

C. Perform testing and balancing of existing systems to the extent that existing systems are affected by the renovation work.

1. Compare the indicated airflow of the renovated work to the measured fan airflows, and determine the new fan speed and the face velocity of filters and coils.
2. Verify that the indicated airflows of the renovated work result in filter and coil face velocities and fan speeds that are within the acceptable limits defined by equipment manufacturer.

3. If calculations increase or decrease the air flow rates and water flow rates by more than 5 percent, make equipment adjustments to achieve the calculated rates. If increase or decrease is 5 percent or less, equipment adjustments are not required.
4. Balance each air outlet.

3.10 GENERAL PROCEDURES FOR PLUMBING SYSTEMS

A. Measure pressure drop across each backflow preventer assembly at design flows.

B. Measure water flow at pumps. Use the following procedures except for positive-displacement pumps:

1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
   a. If impeller sizes must be adjusted to achieve pump performance, obtain approval from Architect Owner Construction Manager and comply with requirements in Section 22 50 00 “Plumbing Equipment Section 22 11 23 "Domestic Water Pumps."

2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.
   a. Monitor motor performance during procedures and do not operate motors in overload conditions.

3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
4. Report flow rates that are not within range given in article, Tolerances.

C. Set calibrated balancing valves, if installed, at calculated presettings.

D. Measure flow at all stations and adjust, where necessary, to obtain first balance.

1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

E. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.

F. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:

1. Determine the balancing station with the highest percentage over indicated flow.
2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
3. Record settings and mark balancing devices.

G. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.

H. Measure the differential-pressure-control-valve settings existing at the conclusion of balancing.

I. Check settings and operation of each safety valve. Record settings.

3.11 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 10 percent and minus 0 percent.
2. Air Outlets and Inlets: Plus 5 percent and minus 5 percent.
3. Multiple outlets within single room: Plus 5 percent and minus 0 percent for total airflow within room. Tolerance for individual outlets within a single room having multiple outlets shall be as for “Air Outlets and Inlets.”

B. Set plumbing systems water flow rates within plus or minus 10 percent.

3.12 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Interim Reports: Prepare periodic lists of conditions requiring correction and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.13 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing field supervisor. Report shall be co-signed by the Contractor, attesting that he has reviewed the report, and the report has been found to be complete and accurate.
2. The certification sheet shall be followed by sheet(s) listing items for which balancing objectives could not be achieved. Provide explanation for failure to achieve balancing objectives for each item listed.
3. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.

4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Project Performance Guaranty
6. Architect's name and address.
7. Engineer's name and address.
8. Contractor's name and address.
9. Report date.
10. Signature of TAB supervisor who certifies the report.
11. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
12. Summary of contents including the following:
    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.
13. Nomenclature sheets for each item of equipment.
14. Data for terminal units, including manufacturer's name, type, size, and fittings.
15. Test conditions for fans and pump performance forms including the following:
    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Pipe and valve sizes and locations.
4. Terminal units.
5. Balancing stations.
6. Position of balancing devices.

E. Air distribution outlets and inlets shall be shown on keyed plans with designation for each outlet and inlet matching designation used in Contract Documents and TAB test reports. Room numbers shall be included in keyed plans and test reports. Where multiple outlets and inlets are installed within a

single room, a designation shall be assigned and listed for each outlet and inlet in addition to room number.

F. Test Reports – General:

1. All test reports containing air or liquid flow data shall record flow values prior to system adjustment in addition to required data listed for each test report.

G. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:
   a. Unit identification.
   b. Location.
   c. Make and type.
   d. Model number and unit size.
   e. Manufacturer's serial number.
   f. Unit arrangement and class.
   g. Discharge arrangement.
   h. Sheave make, size in inches, and bore.
   i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
   j. Number, make, and size of belts.
   k. Number, type, and size of filters.

2. Motor Data:
   a. Motor make, and frame type and size.
   b. Horsepower and rpm.
   c. Volts, phase, and hertz.
   d. Full-load amperage and service factor.
   e. Sheave make, size in inches, and bore.
   f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):
   a. Total air flow rate in cfm.
   b. Total system static pressure in inches wg.
   c. Fan rpm.
   d. Discharge static pressure in inches wg.
   e. Filter static-pressure differential in inches wg.
   f. Preheat-coil static-pressure differential in inches wg.
   g. Cooling-coil static-pressure differential in inches wg.
   h. Heating-coil static-pressure differential in inches wg.
   i. Outdoor airflow in cfm.
   j. Return airflow in cfm.
   k. Relief airflow in cfm.
   l. Outdoor-air damper position, normal and economizer, power exhaust, or power exhaust economizer modes, as applicable to installed equipment.
   m. Return-air damper position.
   n. Relief-air damper position, normal and economizer, power exhaust, or power exhaust economizer modes, as applicable to installed equipment.
   o. Vortex damper position.

H. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:

1. Unit Data:
   a. System identification.
   b. Location.
   c. Coil identification.
   d. Capacity in Btu/h.
   e. Number of stages.
   f. Connected volts, phase, and hertz.
   g. Rated amperage.
   h. Air flow rate in cfm.
   i. Face area in sq. ft.
   j. Minimum face velocity in fpm.

2. Test Data (Indicated and Actual Values):
   a. Heat output in Btu/h.
   b. Air flow rate in cfm.
   c. Air velocity in fpm.
   d. Entering-air temperature in deg F.
   e. Leaving-air temperature in deg F.
   f. Voltage at each connection.
   g. Amperage for each phase.

I. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:
   a. System identification.
   b. Location.
   c. Make and type.
   d. Model number and size.
   e. Manufacturer's serial number.
   f. Arrangement and class.
   g. Sheave make, size in inches, and bore.
   h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:
   a. Motor make, and frame type and size.
   b. Horsepower and rpm.
   c. Volts, phase, and hertz.
   d. Full-load amperage and service factor.
   e. Sheave make, size in inches, and bore.
   f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
   g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):
   a. Total airflow rate in cfm.
   b. Total system static pressure in inches wg.
   c. Fan rpm.

d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

J. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:
   a. System and air-handling-unit number.
   b. Location and zone.
   c. Traverse air temperature in deg F.
   d. Duct static pressure in inches wg.
   e. Duct size in inches.
   f. Duct area in sq. ft.
   g. Indicated air flow rate in cfm.
   h. Indicated velocity in fpm.
   i. Actual air flow rate in cfm.
   j. Actual average velocity in fpm.
   k. Barometric pressure in psig.

K. Air-Terminal-Device Reports:

1. Unit Data:
   a. System and air-handling unit identification.
   b. Location and zone.
   c. Apparatus used for test.
   d. Area served.
   e. Make.
   f. Number from system diagram.
   g. Type and model number.
   h. Size.
   i. Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):
   a. Air flow rate in cfm.
   b. Air velocity in fpm.
   c. Preliminary air flow rate as needed in cfm.
   d. Preliminary velocity as needed in fpm.
   e. Final air flow rate in cfm.
   f. Final velocity in fpm.
   g. Space temperature in deg F.

L. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:
   a. Unit identification.
   b. Location.
   c. Service.
   d. Make and size.

e. Model number and serial number.
f. Water flow rate in gpm.
g. Water pressure differential in feet of head or psig.
h. Required net positive suction head in feet of head or psig.
i. Pump rpm.
j. Impeller diameter in inches.
k. Motor make and frame size.
l. Motor horsepower and rpm.
m. Voltage at each connection.
n. Amperage for each phase.
o. Full-load amperage and service factor.
p. Seal type.

2. Test Data (Indicated and Actual Values):
   a. Static head in feet of head or psig.
   b. Pump shutoff pressure in feet of head or psig.
   c. Actual impeller size in inches.
   d. Full-open flow rate in gpm.
   e. Full-open pressure in feet of head or psig.
   f. Final discharge pressure in feet of head or psig.
   g. Final suction pressure in feet of head or psig.
   h. Final total pressure in feet of head or psig.
   i. Final water flow rate in gpm.
   j. Voltage at each connection.
   k. Amperage for each phase.

M. Instrument Calibration Reports:

1. Report Data:
   a. Instrument type and make.
   b. Serial number.
   c. Application.
   d. Dates of use.
   e. Dates of calibration.

3.14 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:
   a. Measure airflow of at least 10 percent of air outlets.
   b. Measure water flow of at least 5 percent of terminals.
   c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
   d. Verify that balancing devices are marked with final balance position.
   e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect .
2. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Architect .
3. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than 10 percent, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contact the TAB specialists' governing organization for remedial action by the governing organization under the workmanship and performance warranty. See article, Warranty.
3. If remedial action is not provided by the TAB specialists' governing organization in a timely manner, Owner may contract the services of another TAB specialist to complete the TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB specialists' final payment.

D. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

A. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION

SECTION 23 80 00

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Fans.
2. Relief and intake vents.
3. Louvers.
4. Air inlets and outlets.
5. Dampers.
6. Insulation.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 23 00 50, Basic HVAC Materials and Methods.

C. Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

D. Section 23 09 23, Direct Digital Control (DDC) System for HVAC.

1.03 ACTION SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, dimensions, weight, corner or mounting point weights, furnished specialties and accessories; and installation and start-up instructions. Product data shall include applicable product listings and standards. Refer to Section 23 00 50, Basic HVAC Material and Methods for additional requirements.

1. Upon approval of submittal, provide manufacturer’s installation and operating instructions to the Project inspector for the following:
   a. Fire dampers, smoke dampers, and combination smoke-fire dampers.

C. Engineering Data: Submit fan curves and sound power level data for each fan unit. Data shall be at the scheduled capacity. Data shall include the name of the rating agency or independent laboratory.

1.04 INFORMATIONAL SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Record of pre-installation meeting.

C. Coordinated Layouts: Submit coordinated layouts. For requirements refer to article, Coordinated Layouts, in this Section.

1.05 CLOSEOUT SUBMITTALS

A. For additional requirements, refer to Section 23 00 50, Basic HVAC Materials and Methods.

B. Maintenance Data: Submit maintenance data and parts list for each piece of equipment, control, and accessory; including "trouble-shooting guide," in Operation and Maintenance Manual.

C. Record Drawings: Submit Record Drawings of installed ductwork, duct accessories, and outlets and inlets in accordance with requirements of Division 01.

1.06 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Belts: One set(s) for each belt-driven unit.
2. Provide one complete set(s) of filters for each filter bank.

1.07 COORDINATED LAYOUT

A. Coordinated layouts are required to amplify, expand and coordinate the information contained in the Contract Documents.

B. Provide minimum 1/4 inch equals one foot scaled coordinated layout drawings showing plan and pertinent section or elevation views of piping, ductwork, equipment, accessories, and electrical systems. Drawings shall be reproducible and work of each trade represented shall be fully coordinated with structure, other disciplines, and finished surfaces. Drawings shall be presented on a single size sheet. Coordinated layout drawings shall have title block, key plan, north arrow and sufficient grid lines to provide cross-reference to design Drawings.

1. Provide a stamp or title block on each drawing with locations for signatures from all contractors involved, including but not limited to the General, HVAC, Plumbing, Fire Protection, and Electrical contractors. Include statement for signature that the contractor has reviewed the coordinated layout drawings in detail and has coordinated the work of his trade.
2. Show on drawings the intended elevation of all ductwork in accordance with the following example:

   B.O.D. = 9'-0"
   OFFSET UP 6"
   B.O.D. = 9'-6"

3. Highlight, encircle or otherwise indicate deviations from the Contract Documents on the coordinated layouts. Architect will not be responsible for identifying deviations from the original Contract Documents.

C. Since scale of contract drawings is small and all offsets and fittings are not shown, Contractor shall make allowances in bid for additional coordination time, detailing, fittings, offsets, hangers and the

like to achieve a fully coordinated installation. If changes in duct size are required, equivalent area shall be maintained and the aspect ratio shall not be in excess of 2 to 1 unless approved by the engineer. Drawings shall be submitted for review prior to fabrication and installation. Drawings may be submitted in packages representing at least one quarter of the building ductwork.

D. Check routing on all ductwork before fabricating. Report any discrepancies to Architect. No extra cost will be allowed for failure to conform to above.

1.08 QUALITY ASSURANCE

A. Design Criteria:

1. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture. All gas-fired equipment shall be UL, ETL or CSA listed.
2. Supply all equipment and accessories in accordance with requirements of applicable national, state and local codes.
3. All items of a given type shall be products of the same manufacturer.
4. Scheduled equipment performance is minimum capacity required.
5. Scheduled electrical capacity shall be considered as maximum available.
6. Scheduled gas BTU input shall be considered as maximum available.

1.09 FIELD CONDITIONS

A. Interruption of Existing Services: Do not interrupt services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of services.
2. Do not interrupt services without Architect's written permission.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).

2.02 GAS FIRED EQUIPMENT

A. All gas-fired equipment shall be listed for use as a gas appliance.

B. All units shall comply with the emissions requirements of the Air Quality Management District (AQMD) in which they are to be installed.

2.03 COOLING COIL

A. Provide direct expansion encased cooling coil.

1. Install encased coil to operate properly in vertical or horizontal position as required. Construct coil with aluminum plate fins mechanically bonded in non-ferrous tubing with all joints brazed ultrasonically. Coil shall have factory-installed refrigerant metering device, refrigerant line fittings which permit mechanical connections, and condensate pan with primary and auxiliary drain connections.
2. Construct casings of galvanneal steel, bonderize, insulate, and finish with baked enamel.

2.04 FANS

A. All fans shall be Air Moving and Control Association Inc. (AMCA) labeled.

B. Provide self-aligning, enclosed ball bearings, accessible for lubrication unless specified otherwise.

C. Provide variable speed switch for all direct drive fans.

D. Roof Mounted:

1. Direct or V-belt Drive: Provide one-piece heavy-duty ventilator housings, one piece heavy gauge spun aluminum construction, with weatherproof assembly and integral weather shield. Mount ventilators on curbs furnished by the fan manufacturer. Install with fan assembly level.
2. Fan wheels shall be centrifugal design, statically and dynamically balanced. Tip speed, rpm and motor horsepower shall not exceed listing in manufacturer's catalog for unit specified.
3. Fans shall have integral factory formed base and one piece spinning without welding. Housings shall be provided with wiring channel and are to be of the direct discharge design. Motor and fan assembly shall be on vibration isolating mounts. Fans shall have capacity, speeds and motor sizes as shown.
4. Provide the following accessories:
   a. Gravity backdraft dampers.
   b. Aluminum bird screen with a minimum of 85 percent free area.
   c. Adjustable motor pulley.
   d. Laboratory fume hood exhaust fans shall be Keysite coated.
   e. Provide grease collection tray for kitchen exhaust fans.
   f. Provide ventilated roof curb for kitchen exhaust fans where exhaust duct is mounted within rated shaft.
   g. Provide hinge kit for kitchen hood exhaust fans.

E. In-Line Propeller Fans:

1. Heavy-duty propeller type with belt or direct drive as specified. Blades shall be individually mounted to wheel.
2. Provide sloped roof or flat roof type roof cap, or wall cap to suit the location indicated on the Drawings.

F. In-Line Centrifugal Fans:

1. Centrifugal fan with airfoil blades, aluminum or steel housing, externally mounted belt-drive motor, external lube tubes, integral support brackets.
2. Provide sloped roof or flat roof type roof cap, or wall cap to suit the location indicated on the Drawings.

G. Ceiling Mounted Fans:

1. Acoustic lined cabinet, built-in back draft damper, vibration isolated fan and motor, variable speed switch.
2. Provide sloped roof or flat roof type roof cap, or wall cap to suit the location indicated on the Drawings.

H. Fan Drives:

1. Drive Design: The design horsepower rating of each drive shall be at least 1.5 times, single belt drives 2 times, the nameplate rating of the motor with proper allowances for sheave diameters, speed ratio, arcs of contact and belt length.
2. Provide variable speed drives, Dayco, Browning, Woods, or equal. Allow for replacement of fan and motor drives and belts as required to suit the balance requirements of the project.
3. Select variable speed drives to allow an increase or decrease of minimum of ten percent of design fan speed.

I. Motors:

1. Motors of 25 HP and less shall have adjustable pitch sheaves; sheaves on motors above 25 HP may be non-adjustable. Change, at no extra cost to Owner, the non-adjustable sheaves to obtain desired air quantities.
2. For single-phase fan motors sized larger than 1/12 hp and smaller than 1 hp, refer to Article, Electric Motors, in Section 23 00 50, Basic HVAC Materials and Methods.

J. Sheaves: Sheaves shall be cast or fabricated, bored to size or bushed with fully split tapered bushings to fit properly on the shafts. All sheaves shall be secured with keys and set screws.

K. Belts:

1. All belts shall be furnished in matched sets.
2. Belts shall be within 1 degree 30 minutes of true alignment in all cases.

L. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Greenheck Fan Corporation.
2. Loren Cook Company.
3. PennBarry.
4. American Coolair Corporation.

M. Fly Fan (Air Curtain)

1. Manufacturer's standard, high velocity, non-recirculating type. Units for kitchens or food storage shall comply with NSF 37.
2. Casing: Sheet metal or polycarbonate plastic. Provide internal or external vibration isolation to effectively prevent transmission of vibration and noise from units to building structure. Units shall completely house all parts and have manufacturer's standard finish coating.

3. Fans: Ruggedly constructed, statically and dynamically balanced. Noise level shall not exceed 77 dBA measured at 5 feet distance.
4. Air Discharge Outlet Nozzle: Cover full width of door opening. Fan discharge ducts, plenum, flow control vanes and nozzles shall provide a uniform distribution of air over entire length of door. Provide adjustable volume and directional control.
5. Heating Coil: Provide electric heating coil. Maximum discharge air temperature shall be 120 degrees F.
6. Controls: Provide on-off door operated switch. The "on-off" switch circuit shall close to start fan motors when door starts to open and open when the door reaches closed position. A local disconnect switch for each fan motor shall be provided and shall be mounted to be accessible without use of ladder.
7. Motors: Provide heavy-duty totally enclosed fan motor, sealed ball bearings, resilient mounting, automatic thermal overload switch, UL listed. Provide weather protection for motor and electrical equipment.
8. Available Manufacturers: Subject to compliance with requirements, manufacturers offering air doors / fly fans which may be incorporated in the work include the following, or equal:
   a. Mars Air Products; Mars Air Door Division.
   b. Berner International.
   c. Fantech.

N. Owner Training: Manufacturer shall provide one on-site 1-hour training session for Owners' maintenance personnel.

2.05 RELIEF AND INTAKE VENTS

A. Galvanized steel housing with 1/2 inch mesh screen, counterbalanced backdraft damper and matching prefabricated curb. Omit backdraft damper on intake vents. Provide pitched roof curb for relief vents, and install with backdraft damper level.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:

1. Greenheck Fan Corporation.
2. Lauren Cook Company.
3. PennBarry.
4. American Coolair Corporation.

2.06 LOUVERS

A. Louvers shall be minimum 16 gauge steel with Bonderite and Epon gray primer and 1/2 inch square mesh, 16 gauge galvanized steel screen on the inside. Louvers shall be Airolite #609, Arrow United Industries, or equal, with 4 inch louver depth.

2.07 AIR INLETS AND OUTLETS

A. Except as otherwise indicated, provide manufacturer's standard inlets and outlets where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.

B. Ceiling, wall or floor Compatibility: Provide inlets and outlets with border styles that are compatible with adjacent ceiling, wall or floor systems, and that are specifically manufactured to fit into ceiling, wall or floor module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems that will contain each type of air outlet and inlet.

C. Refer to Schedule on Mechanical Drawings for details of inlets and outlets to be used.

2.08 DAMPERS

A. Backdraft Dampers: Ruskin CBD2, counterbalanced, Nailer Industries, or equal.

B. Manual Air and Balance Dampers: Provide dampers of single blade type or multi-blade type constructed in accordance with SMACNA, "HVAC Duct Construction Standards," except as noted herein.

1. Rectangular Ductwork:
   a. Single damper blades may be used in ducts up to 10 inches in height. Dampers shall be 16 gauge minimum. Provide self-locking regulators, equal to Ventlok 641. Provide end bearings equal to Ventlok 607 at each damper. Provide continuous solid 3/8 inch square shafts.
   b. Multiple blade dampers shall be equal to Ruskin CD35 Standard Control Damper. Maximum width for multiple damper blades for use in rectangular duct shall not exceed 6 inches.
   c. Where duct velocity may be expected to exceed 1500 fpm, provide Ruskin CD-50, or equal, low leakage dampers with airfoil blades.

2. Round Ductwork:
   a. Single damper blades may be used in ducts up to 12 inches in diameter. Provide multiple blade opposed blade dampers, with connected linkage, for ductwork larger than 12 inches in diameter.
   b. Damper blades for round ductwork shall be 20 gauge steel for ducts up to 12 inches diameter and 16 gauge steel for dampers larger than 12 inches damper. Provide self-locking regulators, equal to Ventlok 641, Durodyne, or equal for operation of dampers. Provide end bearings equal to Ventlok 607 and provide continuous solid 3/8 inch square shafts.

3. Where ductwork is externally insulated, provide self-locking regulators equal to Ventlok 644, Durodyne, or equal for rectangular ductwork, and Ventlok 637, Durodyne, or equal for round ducts.

C. Fire Dampers and Combination Fire/Smoke Dampers:

1. Fire dampers and combination fire/smoke dampers shall be listed and approved by the California State Fire Marshal. Installation shall conform to the manufacturer’s UL approved installation instructions.
   a. Fire dampers shall be UL 555 classified and labeled as dynamic fire dampers approved for wall and floor installation. They shall ship from the manufacturer as an assembly with a minimum 20-gauge factory installed sleeve. Sleeve length shall suit the requirements of the wall construction. Each dynamic fire damper/sleeve assembly shall ship complete with factory “roll formed” one-piece angles with pre-punched holes for easy installation. Dynamic fire dampers for vertical installation must consist of a single section on sizes up to 33” x 36” and a single section on sizes up to 24” x 24” for horizontal installation. 1-1/2 hour dynamic fire

dampers shall be Ruskin DIBD20, Pottorff, or equal. 3 hour dynamic fire dampers shall be Ruskin DIBD230, Pottorff, or equal.

b. Fire dampers for high pressure/velocity systems where velocities exceed 2000 fpm and/or 4" w.g. pressure fire damper shall be Ruskin FD60, Pottorff, or equal.
c. Fire dampers for ceiling installation shall be UL 555C classified and labeled as ceiling dampers. They shall be provided with a thermal insulating blanket to fit the inlet or outlet condition if required by the application. Ceiling dampers shall be Ruskin CFD 2, 3, 4 or 5. Ceiling dampers for ceilings constructed of wood shall have UL tested in design L501 and shall be Ruskin CFD7, Pottorff, or equal.
d. Combination fire/smoke dampers. Dampers shall be UL classified and labeled as Leakage Class I Smoke Dampers in accordance with the latest version of UL 555S. Dampers shall be warranted to be free from defects in material and workmanship for a period of 5 years after date of shipment. Damper/actuator assembly shall be tested to full open and full close at minimum 2000 fpm 250° F heated air and 4" w.g. with airflow in both directions. (Specified select: 250° / 350°, 2000 fpm/3000 fpm). Each damper shall be equipped with "controlled closure" quick detect heat actuated release device to prevent duct and HVAC component damage resulting from instantaneous damper closure. Release device shall be EFL type and shall allow reset from outside the sleeve after moderate temperature exposure. (Replacement type fusible links not acceptable.)
e. Two position combination fire smoke dampers shall be equipped with one or more factory installed, direct coupled, 120 volt, single phase, electric actuator for energize open – fail close operation. Dampers with multiple actuators shall be factory wired with single point connection at the EFL heat release device for connection to power. Damper actuator shall include minimum one-year energized hold open (no cycles) and spring return (fail) close reliability. Damper/actuator shall include minimum 20,000 full open-full close cycle performances.
f. Modulating combination fire smoke dampers shall be equipped with one or more factory installed contact for modulating signal connection. Damper/actuator shall include minimum 100,000 full open-full close cycle performances with spring return (fail) close on loss of power.
g. Round combination fire smoke dampers up to 24" diameter shall be true round type with minimum 20 gauge galvanized steel designed for lowest pressure drop and noise performance. Bearings shall be stainless steel sleeve turning in an extruded hole in the frame. Blade seals shall be silicone edge designed to withstand 450° F and galvanized steel mechanically locked in to the blade edge (adhesive type seals are not acceptable). Each damper shall be equipped with a factory-installed sleeve of 17 inches minimum length and factory "roll formed" one-piece angles with pre-punched holes. Dampers shall be Ruskin FSDR25, Pottorff, or equal.
h. Round (larger than 24" diameter) or rectangular combination fire smoke dampers shall include roll-formed structural hat channel frame, reinforced at the corners, formed from a single piece of minimum 16 gauge equivalent thickness formed from single piece galvanized steel. Bearings shall be stainless steel turning in an extruded hole in the frame. Blade edge seals shall be silicone rubber designed to withstand 450° F and galvanized steel mechanically locked in to the blade edge (adhesive type seals are not acceptable). Each damper shall be equipped with a factory-installed sleeve of 17" minimum length and factory "roll formed" one-piece angles with pre-punched holes for easy installation. Dampers shall be Ruskin FSD60, Pottorff, or equal.
i. 3-hour rated combination fire smoke dampers shall be Ruskin model FSD60-3, Pottorff, or equal.

j. All FSD60 type dampers shall be AMCA licensed and shall bear the AMCA Seal for Air Performance. AMCA certified testing shall verify pressure drop does not exceed .03" w.g. at a face velocity of 1,000 fpm on a 24" x 24" damper.

k. Wall type fire/smoke damper:
   1) Combination fire/smoke dampers for use in the wall of exit corridors shall be classified and labeled as Leakage Class II Smoke Dampers in accordance with the latest version of UL 555S. Dampers shall meet the requirements for combination fire/smoke dampers in paragraph 3 above except AMCA certified testing shall verify pressure drop does not exceed .07" w.g. at a face velocity of 1,000 fpm on a 24" x 24" damper and blades shall be single skin galvanized steel 10 gauge minimum with 3 longitudinal grooves for reinforcement. Dampers shall be Ruskin FSD36, Pottorff, or equal.
   2) Front access combination fire/smoke dampers shall meet all the requirements for combination fire/smoke dampers in paragraph 3 above except pressure drop requirement. In addition the dampers shall be constructed so that actuators and all accessories are accessible from the grille side. Actuators and accessories shall be housed within an integral cabinet on the side of the damper frame and shall not be installed in the air stream in front of the damper. The damper sleeve shall be minimum 14" and flanged to accept a steel framed grille. The sleeve shall be covered with fire resistant material. Dampers shall be Ruskin FSD60FA, Pottorff, or equal.

l. Ceiling type fire/smoke damper for tunnel type corridor construction: Combination fire/smoke dampers for use in the corridor ceiling of tunnel type corridor construction shall be UL classified and labeled as Corridor Damper. Dampers shall meet the requirements of paragraph 4a above except pressure drop testing does not require AMCA certification. Dampers shall be Ruskin FSD36C, Pottorff, or equal.

m. Fusible links shall have temperature rating approximately 50° F above normal maximum operating temperature of the heat producing appliance.
   1) If project requires re-openable fire/smoke dampers, provide Ruskin 165 ° F / 350° F TS150, NCA or equal. The TS150 firestat replaces the EFL and allows the damper to be re-opened from remote location up to 350 ° F. TS150 shall include full open and full closed damper position contacts for interface with remote position indication panel.
   2) Each fire/smoke damper shall be equipped with "controlled closure" quick detect heat actuated release device to prevent duct and HVAC component damage. Release device shall allow easy reset after moderate temperature rise outside the sleeve. Heat release device shall be the Ruskin EFL, NCA or equal.
   3) Unless the system is using a validation control system, each fire/smoke damper shall be equipped with a control panel including blade position indicator lights and a key operated switch. The panel cover shall be oversized for flush mount into the wall or ceiling and shall have a brushed look. Control panel shall be Ruskin MCP2, Pottorff, or equal.

2. All actuators used for smoke dampers or combination fire/smoke dampers shall have a cycle time requirement of not more than every twelve months and shall be rated for continuous "0n" duty and shall be provided with internal spring return. Actuators shall be equipped with pilot light, remote key test switch, end switch and circuitry to activate pilot light on remote key (test) switch located in corridor ceiling adjacent to damper. Electric motors shall be Invensys MA-250, MA-253, Honeywell H2000, or equal.

D. Where required to suit the size of damper required, provide manufacturers standard UL Classified mullions, arranged to support multiple dampers. Assembly shall be of minimum 16 gauge galvanized steel, complete with all accessory caps and framing members required for installation.

2.09 INSULATION MATERIALS

A. General:

1. Insulation products, including insulation, insulation facings, jackets, adhesives, sealants and coatings shall not contain polybrominated diphenyl ethers (PBDEs) in penta, octa, or deca formulations in amounts greater than 0.1 percent (by mass).
2. Products shall not contain asbestos, lead, mercury, or mercury compounds.
3. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
4. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
5. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
6. Test insulation, jackets and lap-seal adhesives as a composite product and confirm flame spread of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with UL723 or ASTM E84.
7. Adhesives and sealants shall comply with testing and product requirements of South Coast Air Quality Management District, Rule 1168.

B. Insulation Materials:

C. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
   a. Design Polymerics.
   b. Foster Brand; H. B. Fuller Construction Products.
   c. Knauf Insulation.

2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
3. Service Temperature Range: 0 to plus 180 deg F.
4. Color: White.

D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
   a. Design Polymerics.
   b. Childers Brand; H. B. Fuller Construction Products.
   c. Foster Brand; H. B. Fuller Construction Products.

2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Color: White.

E. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or equal:
   a. Design Polymerics.
   b. Childers Brand; H. B. Fuller Construction Products.
   c. Foster Brand; H. B. Fuller Construction Products.
   d. Knauf Insulation.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: 0 to plus 180 deg F.
4. Color: White.

2.10 TEMPERATURE CONTROL SYSTEM

A. Refer to Section 23 09 23, Direct Digital Control System for HVAC.

PART 3 - EXECUTION

3.01 ROOF MOUNTED EQUIPMENT INSTALLATION

A. Mount and anchor equipment in strict compliance with Drawings details. Alternate anchorage methods will not be considered for roof mounted equipment.

B. Examine rough-in for roof mounted equipment to verify actual locations of piping and duct connections prior to final equipment installation.

C. Verify that piping to be installed adjacent to roof mounted equipment allows service and maintenance.

D. Verify that gas piping will be installed with sufficient clearance for burner removal and service.

E. Install ducts to termination at top of roof curb and install heavy duty rubber gaskets on supply and return openings and on full perimeter of curb, or as required for an airtight installation, prior to setting unit on curb.

F. Cover roof inside each roof mounted air conditioning unit, heat pump unit, and heating and ventilating unit roof curb with 2 inch thick, 3 pound density fiberglass insulation board.

G. Connect supply and return air ducts to horizontal discharge roof mounted equipment with flexible duct connectors. Provide G 90 galvanized steel weather hood over flexible connections exposed to the weather. Weather hood minimum gauge shall be per PART 2 article, Ductwork, Table A.

H. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.

3.02 FAN INSTALLATION

A. Ceiling Mounted Fans: Mount variable speed switch within fan housing. Mark final balance point on variable speed switch.

B. Provide access doors for fans or motors mounted in ductwork.

C. Mount all fans as detailed on Drawings and in compliance with CBC standards.

D. Fan motors mounted in air-stream to be totally enclosed.

E. Completely line supply, return or exhaust fan cabinets with 1 inch thick, 3/4 pound density acoustic insulation securely cemented in place.

F. Roof fans shall be mounted level.

G. Provide heavy-duty rubber gasket between exhaust fan mounting flange and roof curb, or as required for an airtight installation.

H. Label fume hood fans with sign "CAUTION - HAZARDOUS EXHAUST."

3.03 RELIEF VENT INSTALLATION

A. Install relief vents to provide a level mounting for backdraft damper.

3.04 AIR INLETS AND OUTLETS INSTALLATION

A. Provide all air inlets and outlets with gaskets and install so that there will be no streaking of the walls or ceilings due to leakage. Duct connection to outlet on exposed duct shall be full size of outer perimeter of outlet flange.

B. Unless otherwise indicated on Drawings, provide rectangular galvanized steel plenum on top of each diffuser and ceiling return for connection to ductwork. Line plenum with internal insulation as indicated for lined ductwork. Size plenum to allow full opening into air terminal. Plenum sheet metal gauge shall be equal to gauge for rectangular equivalent of the branch duct serving the air inlet or outlet.

C. Ceiling-mounted air inlets, outlets, or other services installed in T-Bar type ceiling systems shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.

1. Air inlets, outlets, or other services weighing not more than 56 pounds shall have two No. 12 gauge hangers connected from the terminal or service to the structure above. These wires may be slack.
2. Support air inlets, outlets, or other services weighing more than 56 pounds directly from the structure above by approved hangers. Provide 4 taut 12 gauge wires each, attached to the fixture and to the structure above. The 4 taut 12 gauge wires, including their attachment to the structure above must be capable of supporting 4 times the weight of the unit.
3. Secure air inlets and outlets to main runners of ceiling suspension system with two No. 8 sheet metal screws at opposing corners.

D. Furnish all air inlets and outlets with a baked prime coat unless otherwise noted. Provide off-white baked enamel finish on ceiling-mounted air inlets and outlets. Paint exposed mounting screws to match the material being secured.

E. Air inlets and outlets shall match all qualities of these specified including appearance, throw, noise level, adjustability, etc.

3.05 DAMPER INSTALLATION

A. All dampers automatically controlled by damper motors are specified under "Temperature Control System" except those specified with items of equipment.

B. Provide opposed blade manual air dampers at each branch duct connection and at locations indicated on the drawings and where necessary to control air flow for balancing system. Provide an opposed blade balancing damper in each zone supply duct. Provide an access panel or Ventlok flush type damper regulator on ceiling or wall for each concealed damper.

C. Install fusible link fire dampers full size of duct at points where shown or required.

D. Provide 18 inch x 12 inch minimum hinged access doors in ductwork and furring for easy access to each fire damper; insulated access doors in insulated ducts. Label access doors with 1/2 inch high red letters.

1. Provide Ventlok Series 100, Durodyne, or equal access doors with hardware for convenient access to all automatic dampers and other components of the system, insulated type in insulated ducts. Provide Ventlok #202 for light duty up to 2 inch thick doors, #260 heavy-duty up to 2 inch thick doors and #310 heavy-duty for greater than 2 inch thick doors. Provide #260 hinges on all hinged and personnel access doors; include gasketing.

3.06 PIPING INSTALLATION

A. General:

1. All piping shall be concealed unless shown or otherwise directed. Allow sufficient space for ceiling panel removal.
2. Installation of piping shall be made with appropriate fittings. Bending of piping will not be accepted.
3. Install piping to permit application of insulation and to allow valve servicing.
4. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal, or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.
5. Horizontal runs of pipes and conduits suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-6" without written approval from the Architect.
6. Close ends of pipe immediately after installation. Leave closure in place until removal is necessary for completion of installation.
7. Use reducing fittings; bushings shall not be allowed. Use eccentric reducing fittings wherever necessary to provide free drainage of lines and passage of air.
8. Verify final equipment and fixture locations for roughing-in.
9. Where piping is installed in walls within one inch of the face of stud, provide a 16 gauge sheet metal shield plate on the face of the stud. The shield plate shall extend a minimum of 1-1/2 inches beyond the outside diameter of the pipe.
10. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.

11. Install exposed polished or enameled connections with special care showing no tool marks or threads at fittings.
12. Service Markers: Mark the location of each plugged or capped pipe with a 4 inch round by 30 inch long concrete marker, set flush with finish grade. Provide 2-1/2 inch diameter engraved brass plate as part of monument marker.
13. Pipe the discharge of each relief valve, air vent, backflow preventer, and similar device to floor sink or drain.

B. Sleeves:

1. Install Adjus-to-Crete, Pipeline Seal and Insulator, or equal, pipe sleeves of sufficient size to allow for free motion of pipe, 24 gauge galvanized steel. The space between pipe and sleeves through floor slabs on ground, through outside walls above or below grade, through roof, and other locations as directed shall be caulked with oakum and mastic and made watertight. The space between pipe and sleeve and between sleeve and slab or wall shall be sealed watertight.
2. At Contractor's option, Link-Seal, Metraflex Metraseal, or equal, casing seals may be used in lieu of caulking. Wrap pipes through slabs on grade with 1 inch thick fiberglass insulation to completely isolate the pipe from the concrete.

C. Floor, Wall, and Ceiling Plates:

1. Fit all pipes with or without insulation passing through walls, floors, or ceilings, and all hanger rods penetrating finished ceilings with chrome-plated or stainless escutcheon plates.

D. Firestopping:

1. Pack the annular space between pipe sleeves and pipes penetrating floors and walls with UL listed fire stop, and sealed at the ends. All pipe penetrations shall be UL listed, Hilti, 3M Pro-Set, or equal.
    a. Install fire caulking behind mechanical services installed within fire rated walls, to maintain continuous rating of wall construction.

2. Provide SpecSeal Systems UL fire rated sleeve/coupling penetrators for each pipe penetration or fixture opening passing through floors, walls, partitions or floor/ceiling assemblies. All Penetrators shall comply with UL Fire Resistance Directory (Latest Edition), and in accordance with CBC requirements.
3. Sleeve penetrators shall have a built in anchor ring for waterproofing and anchoring into concrete pours or use the special fit cored hole penetrator for cored holes.
4. Copper and steel piping shall have SpecSeal, or equal, plugs on both sides of the penetrator to reduce noise and to provide waterproofing.
5. Firestopping systems to be installed in strict accordance with manufacturer's instructions.
6. Alternate firestopping systems are acceptable if approved equal. However, any deviation from the above specification requires the Contractor to be responsible for determining the suitability of the proposed products and their intended use, and the Contractor shall assume all risks and liabilities whatsoever in connection therewith.

E. Flashing:

1. The work of this section shall include furnishing, layout, sizing, and coordination of penetrations required for the mechanical work.
2. Refer to Division 07 specifications and Drawings details as applicable.
3. Flashing for penetrations of metal or membrane roof for pipes shall be coordinated with the roofing manufacturer and roofing installer for the specific roofing type.
   a. Furnish and install flashing and counterflashing in strict conformance with the requirements of the roofing manufacturer. Submit shop drawing details for review prior to installation.
   b. Furnish and install counterflashing above each flashing required. Provide Stoneman, or equal, vandalproof top and flashing combination. Elmdor/Stoneman Model 1540.

4. Furnish and install flashing and counterflashing in strict conformance with the requirements of the roofing manufacturer. Submit shop drawing details for review prior to installation.

3.07 PIPE JOINTS AND CONNECTIONS

A. General:

1. Cutting: Cut pipe and tubing square, remove rough edges or burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt and debris from inside and outside of pipe before assembly.
3. Boss or saddle type fittings or mechanically extracted tube joints will not be allowed.

B. Flexible Connections:

1. Furnish and install Thermo Tech., Inc. F/J/R, Metraflex, or equal, flexible couplings with limiter bolts on piping connections to all equipment mounted on anti-vibration bases, except fan coil units under 2000 cfm, on each connection to each base mounted pump and where shown. Couplings shall be suitable for pressure and type of service.
2. Anchor piping securely on the system side of each flexible connection.

3.08 HANGER AND SUPPORT INSTALLATION

A. General: Support ductwork, equipment and piping so that it is firmly held in place by approved iron hangers and supports, and special hangers. Hanger and support components shall support weight of ductwork, equipment and pipe, fluid, and pipe insulation based on spacing between supports with minimum factor of safety of five based on ultimate strength of material used. Do not exceed manufacturer's load rating. Pipe attachments or hangers, of same size as pipe or tubing on which used, or nearest available. Rigidly fasten hose faucets, fixture stops, compressed air outlets, and similar items to the building construction. The Architect shall approve hanger material before installation. Where building structural members do not match piping and ductwork support spacing, provide “bridging” support members firmly attached to building structural members in a fashion approved by the structural engineer.

1. Materials, design, and type numbers for support of piping per Manufacturers' Standardization Society (MSS), Standard Practice (SP)-58.
   a. Provide copper-plated or felt-lined hangers for use on uninsulated copper tubing.

2. Materials and design for ductwork support shall be per SMACNA “HVAC Duct Construction Standards, Metal and Flexible.”

B. Hanger components shall be provided by one manufacturer: B-Line, Grinnell, Unistrut, Badger, or equal.

C. Riser clamps: B-line model B3373, or equal.

D. Rubber Neoprene Pipe Isolators:

1. Pipe isolators shall comprise an internal rubber or neoprene material that isolates pipe from hanger and structure. Install at all piping located in acoustical walls. Refer to Architectural Drawings for location of acoustical walls.
2. Isolation material shall be either a rubber or neoprene material that prevents contact between the pipe and the structure. The rubber shall have between a 45 to 55 durometer rating and a minimum thickness of 1/2 inch.
3. Manufacturers:
   a. Vertical runs: Acousto-Plumb or equal.
   b. Horizontal runs: B-Line, Vibraclamp; Acousto-Plumb or equal.

E. Pipe Hanger and Support Placement and Spacing:

1. Provide a support or hanger close to each change of direction of pipe either horizontal or vertical and as near as possible to concentrated loads.
2. Vertical piping hanger and support spacing: Provide riser clamps for piping, above each floor, in contact with the floor. Provide support at joints, branches, and horizontal offsets. Provide additional support for vertical piping, spaced at or within the following maximum limits:

Pipe Diameter	Steel Threaded or Welded (Note 3)	Copper Brazed or Soldered (Notes 3, 4)	CPVC & PVC (Note 2)
1/2 - 1”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
1-1/4 - 2”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
2-1/2 - 3”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)
Over 4”	12 ft.	Each Floor, Not to Exceed 10 ft.	Base and Each Floor (Note 1)

   a. Note 1: Provide mid-story guides.
   b. Note 2: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
   c. Note 3: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
   d. Note 4: Includes refrigerant piping, including vapor and hot gas pipes.

3. Horizontal piping, hanger and support spacing: Locate hangers and supports at each change of direction, within one foot of elbow, and spaced at or within following maximum limits:

Pipe Diameter	Steel Threaded or Welded (Note 2)	Copper Brazed or Soldered (Notes 2, 3)	CPVC & PVC (Note 1)
1/2 - 1"	6 ft.	5 ft.	3 ft.
1-1/4 - 2"	7 ft.	6 ft.	4 ft.
2-1/2 - 3"	10 ft.	10 ft.	4 ft.
Over 4"	10 ft.	10 ft.	4 ft.

   a. Note 1: For PVC piping, provide for expansion every 30 feet per IAPMO installation standard. For CPVC piping, provide for expansion per IAPMO installation standard.
   b. Note 2: Spacing of hangers and supports for piping assembled with mechanical joints shall be in accordance with standards acceptable to authorities having jurisdiction.
   c. Note 3: Includes refrigerant piping, including vapor and hot gas pipes.

4. Suspended Piping:
   a. Individually suspended piping: B-Line B3690 J-Hanger or B3100 Clevis, complete with threaded rod, or equal. All hangers on supply and return piping handling heating hot water or steam shall have a swing connector at point of support.

Pipe Size	Rod Size Diameter
2" and Smaller	3/8"
2-1/2" to 3-1/2"	1/2"
4" to 5"	5/8"
6"	3/4"

   b. Suspend rods from concrete inserts with removable nuts where suspended from concrete decks. Power actuated inserts will not be allowed.
   c. Trapeze Suspension: B-Line, or equal, 1-5/8 inch width channel in accordance with manufacturers' published load ratings. No deflection to exceed 1/180 of a span.
   d. Trapeze Supporting Rods: Shall have a safety factor of five; securely anchor to building structure.
   e. Pipe Clamps and Straps: B-Line B2000, B2400, or equal. Where used for seismic support systems, provide B-Line B2400 series, or equal, pipe straps.

5. Provide support for piping through roof, arranged to anchor piping solidly in place at the roof penetration.

F. Piping Support to Structure:

1. Wood Structure: Provide and install wood blocking as required to suit structure. Provide lag screws or through bolts with length to suit requirements, and with size (diameter) to match the size of hanger rods required.
   a. Do not install Lag screws in tension without written review and acceptance by Structural Engineer.

Side Beam Angle Clip	B-Line B3062--MSS Type 34
Side Beam Angle Clip	B-Line B3060
Ceiling Flange	B-Line B3199

   b. Blocking for support of piping shall be not less than 2 inch thick for piping up to 2 inch size. Provide 3 inch blocking for piping up through 5 inch size, and 4 inch blocking for larger piping. Provide support for blocking in accordance with Structural Engineers requirements.
   c. Where lag screws are used, length of screw shall be 1/2 inch less than the wood blocking. Pre-drill starter holes for each lag screw.

3.09 INSULATION AND FIELD-APPLIED JACKET INSTALLATION

A. General:

1. The term "piping" used herein includes pipe, air separators, valves, strainers and fittings.
2. Clean thoroughly, test and have approved, all piping and equipment before installing insulation and/or covering.
3. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, ductwork, and equipment.
4. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment as specified in insulation system schedules.
5. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
6. Install insulation with longitudinal seams at top and bottom of horizontal runs.
7. Install multiple layers of insulation with longitudinal and end seams staggered.
8. Keep insulation materials dry during application and finishing.
9. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
10. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
11. Install insulation in removable segments on equipment access doors, manholes, handholes, and other elements that require frequent removal for service and inspection. Bevel and seal insulation ends around manholes, handholes, ASME stamps, and nameplates.
12. For piping, ductwork, and equipment, with surface temperatures below ambient, apply mastic to open ends, joints, seams, breaks, and punctures in insulation.

13. Repair all damage to existing pipe, duct and equipment insulation whether or not caused during the work of this contract, to match existing adjacent insulation for thickness and finish, but conforming to flame spread and smoke ratings specified above.
14. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
    a. Install insulation continuously through hangers and around anchor attachments.
    b. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
    c. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
    d. Cover inserts with jacket material matching adjacent insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

3.10 TEMPERATURE CONTROL SYSTEM INSTALLATION

A. Provide thermostats where indicated on drawings. All wiring shall be in conduit. Provide all relays, transformers and the like to render the control system complete and fully operable. All control conduit to be rigid steel type.

3.11 EQUIPMENT START-UP

A. Initial start-up of the systems and pumps shall be under the direct supervision of the Contractor.

B. Equipment start-up shall not be performed until the piping systems have been flushed and treated and the initial water flow balance has been completed.

C. It shall be the responsibility of the Contractor to assemble and supervise a start-up team consisting of controls contractor, start-up technician, and test and balance contractor; all to work in concert to assure that the systems are started, balanced, and operate in accordance with the design.

D. After start-up is complete, instruct the Owner's personnel in the operation and maintenance of the systems. Obtain from the Owner's representative a signed memo certifying that instruction has been received.

E. For additional requirements, refer to article, Check, Test and Start Requirements, in Section 23 00 50, Basic HVAC Materials and Methods.

3.12 TESTING AND BALANCING

A. For testing and balancing requirements, refer to Section 23 05 93, Testing and Balancing for HVAC.

3.13 CLEANING AND PROTECTION

A. As each duct section is installed, clean interior of ductwork of dust and debris. Clean external surfaces of foreign substances that might cause corrosive deterioration of metal or where ductwork is to be painted.

B. Temporary Closure: At ends of ducts that are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering that will prevent entrance of dust and debris until connections are to be completed.

C. As each internally lined duct section is installed, check internal lining for small cuts, tears, or abrasions. Repair all damage with fire retardant adhesive.

3.14 EQUIPMENT MOUNTING

A. Mount and anchor equipment in strict compliance with Drawings details. Alternate anchorage methods will not be considered for roof mounted equipment.

END OF SECTION