REHABILITATION OF:

WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM

Waltham High School
617 Lexington Street
Waltham, MA 02452

JFF Project No. 201205 MAY 30, 2012

PROJECT MANUAL

OWNER:

City of Waltham
Waltham Public Schools
617 Lexington Street
Waltham, MA 02452

Skip Bandini, Director of Facilities
781-314-5607

ARCHITECT:

JFF Design, Architects
24 Warwick Avenue
Waltham, MA 02452
Tel. 781-899-6908
Fax. 781-899-3050

ENGINEERS:

Environmental Design Engineering,Inc.
440 Totten Pond Road
Waltham, MA 02451
Tel. 781-890-4555
Fax 781-890-4611

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SECTION 00020 – INVITATION TO BID

The City of Waltham and its Mayor acting through its Purchasing Agent, hereinafter called the Awarding Authority, will receive sealed bids for the CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM, Waltham High School, Waltham, Massachusetts/ The work of this Contract includes the complete rehabilitation of the Chef's Kitchen, Cosmetology Lab and Title IX Locker Room.

The estimated cost of construction is Five Hundred Fifty Thousand Dollars ($550,000.)

All bids for this project are subject to the provisions of Massachusetts General Laws, Chapter 149, Sections 44A through 44J inclusive and applicable sections of Chapter 30, as most recently amended. Bids are also subject to the provisions of Designing and Constructing Municipal Facilities Manual, latest edition.

To be given consideration, all General Bids and all Sub-Bids must file their bids together with a copy of Division of Capital Asset Management Certificate of Eligibility (DCAM Form CQ7) and a copy of Division of Capital Asset Management Contractor Update Statement (DCAM Form CQ3), in accordance with Massachusetts General Laws, Chapter 149, Section 44D, as amended, and other certifications listed in the specifications. Every Bidder must be certified by the Division of Capital Asset Management in the categories of General Building category in accordance with the Commonwealth of Massachusetts General Laws, for the dollar amount of this project and each Sub-Bidder must be certified in their respective categories.

Successful bidder will be required to furnish Performance Bond and Labor and Material or Payment Bond, as set forth in the specifications.

Not less than the minimum wage rates must be paid on the work of this project, as determined by the Division of Occupational Safety under the provisions of Massachusetts General Laws, Chapter 149, Section 26 to 27H inclusive.

The City of Waltham Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program, including Special Provisions for Participation by Minority and Women Business Enterprises, applies to this Invitation for Bids.

A weekly certified payroll submittal shall be required of the successful bidder, throughout the course of the project, in accordance with MGL C149, S27B. No payments will be made by the City until all payroll information necessary for the City to determine compliance with prevailing wage laws and affirmative action/equal opportunity requirements for the time period of the request have been submitted.

Bidding documents, including drawings and specifications and Addenda, will be made available to bidders on line at www.city.waltham.ma.us/open-bids or via e-mail request only at jpedulla@city.waltham.ma.us after 10:00 AM, May 30, 2012

A **PRE-BID CONFERENCE** will be held on, Monday, June 4, 2012 @ 10:00 AM beginning in the main entry lobby of the Waltham Senior High School, 617 Lexington Street, Waltham, MA.

Sealed **SUB-BIDS** for the categories of "HVAC", "Electrical" & "Plumbing" will be received in sealed envelopes clearly marked "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX , LOCKER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts" until 10:00 AM, June 6, 2012 for FILED SUB-BIDDERS, at the Office of the Purchasing Agent, City Hall, 610 Main Street, Waltham, Massachusetts 02452 at which place and time they shall be publically opened, read aloud and recorded for presentation to the Awarding Authority.

Sealed **GENERAL BIDS** will be received in sealed envelopes clearly marked "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts" until 3:00 PM, prevailing time, June 13, 2012 for GENERAL BIDS at the Office of the Purchasing Agent, City Hall, 610 Main Street, Waltham, Massachusetts

02452 at which place and time they shall be publically opened, read aloud and recorded for presentation to the Awarding Authority.

The Awarding Authority reserves the right to reject any or all general bids, if it be in the public interest to do so, and to reject any sub-bid on any sub-trade if it determines that such sub-bid does not represent the sub-bid of a person competent to perform the work as specified or that less than three sub-bids were received and that the prices are not reasonable for acceptance without further competition.

The successful bidder will be required to furnish a **Certificate of Insurance**, naming the City of Waltham and JFF Design, Architects as **a NAMED Additional Insured for all insurances** with a waiver of subrogation, for the General Liability and Vehicle Liability in the amount of $500,000 per occurrence and $1,000,000 in the aggregate and Worker's Compensation Insurance as prescribed by law.

In accordance with M.G.L., the undersigned certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by OSHA that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

Certified check, or a treasurer's or cashier's check issued by a responsible bank or trust company, or bid bond, made payable to the City of Waltham shall be submitted with each general bid and each sub-bidder in the amount of five percent (5%) of the bid price.

No bid may be withdrawn for a period of fifteen (15) days subsequent to the opening of bids.

END OF SECTION 00020

SECTION 00100 – INSTRUCTION TO BIDDERS

1. BIDS

A. Bids from General Bidders shall be for the complete project as specified, and shall include names of Subcontractors and amounts of their bids as designated in "Bid Form For Sub-Bidders". Bids shall also include amounts for alternates stated. Contractor shall be selected on basis of such bids.

B. Every Bidder must be certified by the Division of Capital Asset Management in the categories of General Building category in accordance with the Commonwealth of Massachusetts General Laws, for the dollar amount of this project and each Sub-Bidder must be certified in their respective categories.

1.1 BID FORM AND PROCEDURE

A. To be given consideration, all General Bids and all Sub-Bids must file their bids together with a copy of Division of Capital Asset Management Certificate of Eligibility (DCAM Form CQ7) and a copy of Division of Capital Asset Management Contractor Update Statement (DCAM Form CQ3), in accordance with Massachusetts General Laws, Chapter 149, Section 44D, as amended, and other certifications listed in the specifications. Every Bidder must be certified by the Division of Capital Asset Management in the categories of General Building category in accordance with the Commonwealth of Massachusetts General Laws, for the dollar amount of this project and each Sub-Bidder must be certified in their respective categories.

B. All general bidders and sub-bidders bids shall be submitted on a separate form furnished with this bid package or copies thereof, and shall be subject to all requirements of all general conditions, of the specifications and drawings. Erasures or other changes must be explained or noted over the signature of the Bidder.

C. All Bidders shall submit one set of executed Bid Forms and Documents to the Office of the Purchasing Agent, City Hall, 610 Main Street, Waltham, Massachusetts 02452.

D. Bids for the work are subject to the provisions of General Laws, Chapter 149, Sections 44A-44L inclusive, as amended. Regulations governing the bidding procedures as set forth in the above mentioned amended General Laws must be followed.

E. In the event of any inconsistencies between any of the provisions of these Contract Documents and of the cited statute, anything herein to the contrary notwithstanding, the provisions of the said statute shall control.

F. No General Bid received by the Awarding Authority after the time respectively established herein for the opening of General Bids will be considered, regardless of the cause for the delay in the receipt of any such bid.

1.2 TIME OF RECEIVING BIDS

A. Sealed **SUB-BIDS** for the categories of "HVAC", "Electrical" & "Plumbing" will be received in sealed envelopes clearly marked "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts" until 10:00 AM, June 6, 2012 for FILED SUB-BIDDERS, at the Office of the Purchasing Agent, City Hall, 610 Main Street, Waltham, Massachusetts 02452 at which place and time they shall be publically opened, read aloud and recorded for presentation to the Awarding Authority.

B. Sealed **GENERAL BIDS** will be received in sealed envelopes clearly marked "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts" until 3:00 PM, prevailing time, June 13, 2012 for GENERAL BIDS at the Office of the Purchasing Agent, City Hall, 610 Main Street, Waltham, Massachusetts 02452 at which place and time they shall be publically opened, read aloud and recorded for presentation to the Awarding Authority.

1.3 BID DEPOSIT

A. Bid Deposit:
No bid will be received from GENERAL BIDDERS or SUB-BIDDERS bidders unless accompanied by certified check or treasurer's or cashier's check issued by a responsible bank or trust company or bid bond, made payable to the City of Waltham, Massachusetts, in amount specified in Invitation to Bid.

B. Return of Bid Deposit:
Bid deposits of the three lowest responsible and eligible bidders shall be returned within five (5) days, Sundays, and holidays excluded, after execution of contract with Contractor. Bid deposits of all others shall be returned within five (5) days, Sundays and holidays excluded, after opening of proposals.
If the selected bidder fails to execute a contract with the Owner within five (5) days, Sundays and holidays excluded, amount received as bid deposit from bidder through his certified, check, treasurer's or cashier's check, shall become and be the property of the Owner as liquidated damages, provided that in case of death, disability or unforeseen circumstances affecting bidder, such deposit shall be returned to him.

1.4 USE OF BIDS

A. Rejection of General Bids:
The Owner reserves the right to reject any or all bids if it be in the public interest to do so, in accordance with applicable state laws.

1.5 INTERPRETATION OF CONTRACT DOCUMENTS

A. No oral interpretation will be made to any bidder. All questions or requests for interpretations must be made in writing to the Architect.

B. Every interpretation made to a bidder will be in the form of an Addendum to the drawings and/or specifications, which will be made available to all persons to whom Contract Documents have been issued.

C. Failure of the Awarding Authority to send, or of any general bidder or sub-bidder to receive any such Addendum shall not relieve any bidder or sub-bidder from obligation under his bid as submitted.

D. All such Addenda shall become a part of the Contract Documents.

1.6 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. Each bidder shall visit the site of the proposed work and fully acquaint himself with conditions as they exist, and shall also thoroughly examine the Contract Documents. Failure of any bidder to visit the site and acquaint himself with the Contract Documents shall not relieve any bidder from any obligation with respect to his bid.

B. By submitting a bid, the bidder agrees that the Contract Documents are adequate and that the required result for a full and complete installation can be produced. The successful bidder shall furnish any and all labor, materials, insurance, permits and all other items needed to produce the required result to the satisfaction of the Awarding Authority.

1.7 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

A. The work shall commence at the time stated in the notice to the Contractor to proceed by the City of Waltham and shall be substantially completed within one hundred eighty (180) consecutive calendar days. Notice to proceed may be given to the Bidder on any date after the Bidder has executed the contract and furnished the performance and payment bonds with all insurance herein requested. Owner and Contractor recognize that this is of the essence to this agreement and that Owner will suffer financial loss if the work is not substantially complete within the time specified above, plus any extensions thereof allowed via change orders as a result of changes in the work. They also recognize the delays, expense and difficulties

involved in proving in a legal or arbitration proceeding, the actual loss suffered by Owner if the work is not substantially complete on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay, but not as a penalty, Contractor shall pay Owner Five Hundred and no/100 dollars ($500.00) for each day that expires after the time specified above for substantial completion until the work is substantially complete.

1.8 WAGE RATES

A. Not less than the minimum wage rates must be paid on the work of this project, as determined by the Division of Occupational Safety under the Provisions of Massachusetts General Laws, Chapter 149, Section 26 to 27H inclusive. The prevailing wage schedule is available upon request in the office of the Purchasing Agent. Email your request to jpedulla@city.waltham.ma.us .

1.9 WALTHAM PUBLIC SCHOOLS ENVIRONMENTAL POLICY:

A. The Waltham Public Schools is committed to and values the protection of the environment. The Waltham Public Schools Environmental Policy is available for review at the Facilities Department, 617 Lexington Street, Waltham, MA

1.10 TAXES

A. The Public Schools of Waltham, Massachusetts (The Owner) as such is exempt from any federal, state or municipal sales and/or excise tax. The bidders shall propose accordingly and it shall be the responsibility of the successful bidder to obtain the appropriate tax exemption certificate(s) from the Owner for use during the course of the project.

1.11 PERFORMANCE AND PAYMENT BONDS

A. Subsequent to the award of the contract and within five (5) days after the prescribed forms are presented for signature, the successful bidder shall execute and deliver to the Owner a contract in the form stated in the bidding documents in such a number of separate identical parts as the Owner may require. Separate contract forms, in lieu of those found in the bidding documents, shall be used for this purpose.

B. Having satisfied all conditions of award as set forth elsewhere in these documents, the successful bidder shall, within the period specified above, furnish performance and payment bonds in a penal sum of at least one hundred (100) percent each of the amount of the contract as awarded, as security for the faithful performance of the contract and for the payment of all persons, firms or corporations to whom the Contractor may be legally indebted for labor, material, tools, equipment, or services of any nature, employed or used by him in performing the work. Such bonds shall be in a form acceptable to the A/E, shall bear the same date as, or a date subsequent to the date of the contract, and shall be secured from a bond or surety company acceptable to the A/E.

C. On each such bond the rate of premium shall be stated, together with the total amount of premium charged. The current power of attorney for the person who signs for any surety company shall be attached to such bonds.

D. The failure of the successful bidder to execute such contract and to provide the required bonds within five (5) days after the prescribed forms are presented for signature, or within much extended period as the Owner may grant based upon reasons determined adequate by the Owner, the Owner may either award the contract to the next responsible bidder or re-invite desired or selected bidders.

E. Contractor shall include cost of the above bonds in the lump sum base bid.

1.12 VALIDITY OF BIDS

A. Bids shall remain valid and in force unchanged for a period of (45) forty-five calendar days or thirty (30) business days whichever is longer after the prescribed date for submission.

1.13 AWARD OF CONTRACT

A. The Contract shall be awarded to the lowest responsible and eligible General Bidder on the basis of competitive bids in accordance with the procedure set forth in the provision of Section 44B-44L inclusive, as amended or inserted, of Chapter 149 of the General Laws of the Commonwealth of Massachusetts.

B. If the bidder selected as the General Contractor fails to perform his agreement to execute a contract in accordance with the terms of his General Bid, and furnish a Performance Bond and also a Labor and Materials or Payment Bond, as stated in his General Bid in accordance with Section 44F, an award shall be made to the next lowest responsible and eligible bidder.

C. The words "lowest responsible and eligible bidder" shall be the bidder whose name is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work and who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed, or to be employed, on the work. Essential information in regard to such qualifications shall be submitted in such form as the Awarding Authority may require.

D. Action on the award will be taken within thirty (30) days, Saturdays, Sundays and Legal Holidays excluded after the opening of the bids.

1.14 SECURITY FOR FAITHFUL PERFORMANCE

A. The successful bidder must deliver to the Awarding Authority simultaneously with his delivery of the executed contract, an executed Performance Bond, and also a Labor and materials or Payment Bond, each issued by a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of One Hundred Percent (100%) of the Contract Price, as surety for the faithful performance of his contract, and for the payment of all persons performing labor or furnishing materials in connection therewith. Said bonds shall provide that, if the General Contractor fails or refuses to complete the Contract, the Surety Company will be obligated to do so.

B. Premiums are to be paid by the General Contractor, and are to be included in the Contract Price.

1.15 PRE-BID WALK-THRU

A. A pre-bid conference will be held at the site on Monday, June 4, 2012 @ 10:00 AM beginning in the main entry lobby of the Waltham Senior High School, 617 Lexington Street, Waltham, MA. All interested bidders wishing to review the area of work are requested to attend.

1.16 SITE VISITS

A. Prospective bidders are prohibited from going onto the site prior to the Bid Opening or any time other than the pre-bid walk-thru, as set forth in Section 1.15 above, unless authorized by the Architect in an Addendum to the bid documents.

1.17 EQUALITY

A. Except where otherwise specifically provided to the contrary, the words "or approved equal" are hereby inserted immediately following the name or description of each article, assembly, system, or any component part thereof in the Contract Documents. It is the Contractor's responsibility to provide all the research and documentation that would prove a product or assembly is "equal". Failure to provide research or documentation does not alleviate the Contractor's responsibility to meet the schedule.

1.18 TAX FREE NUMBER

A. The City of Waltham has a tax-free number.

1.19 WEEKLY JOB MEETINGS

A. There will be a weekly job meeting at the site on the same agreed upon day and time. Time will be provided to discuss and view the progress of the work and to answer questions. The Contractor's job Superintendent and Project Manager shall attend each meeting.

1.20 PROJECT SUPERINTENDENT

A. The Contractor shall provide the same person as Superintendent for the entire duration of the project. Failure to maintain the same person in this position shall result in a One Thousand Dollar ($1,000.00) penalty per incident which shall cover the Architect's time to re-orient new personnel.

1.21 CONFLICT OF INTEREST

A. A bidder filing a proposal thereby certifies that the proposal is made in good faith, without fraud, collusion, or connection of any kind with any other bidder for the same work, and that the bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.

1.22 PROCEED ORDERS

A. No bidder is to proceed without a proceed order as set out in the contract.

1.23 STAGING

A. The General Contractor shall provide all the vertical access (which includes staging, vertical lifts, etc.) for the work of the Contract over 8'-0" high for the General Bidder and his/her File Sub-Bidders.

1.24 CONSTRUCTION BARRICADES

A. The General Contractor shall provide all barricades to enclose the work area to prevent unauthorized access to the site.

a. The barricades shall provide enough room for all construction activities to be performed while separated from students, and staff on site.

b. Safety is the sole responsibility of the Contractor and any barricades necessary to protect the work and the public shall be provided.

c. Provide entrance tunnel protection at each location of entry and maintain all paths of egress within / around the building. Work shall not impede egress / ingress access to or into or around each of the work sites both interior and exterior.

d. The General Contractor will provide a temporary project screening and access throughout the duration of the project allowing for full privacy within the Title IX Locker Room area. The area will be completely sealed allowing for after-school locker room access to remain but completely isolated and closed off from the work area as determined by the Owner and Architect. The General Contractor will make necessary provisions within this barricade to maintain egress to and from the space by way of a lockable door, keyed into the school security system that allows panic type egress from the locker room side of the barrier.

1.25 INSURANCE

A. The contractor shall purchase and maintain, at his expense all insurance required by the Contract. Documents and all insurance required by the applicable laws of Massachusetts, including but not limited to, General Laws, Chapter 146, in connection with all hoisting equipment.

B. The Contractor shall purchase and maintain such insurance as will protect him from claims under workmen's compensation acts and from claims for damages because of bodily injury, including death and all property damage including, without limitation, damage to buildings and adjoining the site of construction which might arise from and during operations under this

contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them including:

a. Statutory Worker's Compensation and Employer's Liability The contractor shall provide insurance for the payment of compensation and the furnishing of other benefits under Chapter 152 of the General Laws (so-called Worker's Compensation Act) to all persons to be employed under this contract and shall continue in force such insurance as aforesaid shall be deemed a material breach of this Contract and shall operate as an immediate termination thereof. The contractor shall, without limiting the generality of the foregoing, conform to the provisions of Section 34A of Chapter 149 of the General Laws, which Section is incorporated herein by reference and made a part of hereof.

b. Comprehensive General Liability Insurance Minimum bodily injury limits of $500,000 per person and $1,000,000 per accident, and property damage limits of $500,000 per accident and $1,000,000 aggregate during any 12 month period, shall include the following:

1. Public liability (bodily injury and property damage)
2. X.C.U. (explosion, collapse, and underground utilities)
3. Independent contractor's protective liability.
4. Products and completed operations.
5. Save harmless agreement for Owner and Architects set forth in ARTICLE 10.11 of the GENERAL CONDITIONS.

c. Comprehensive All Risk Motor Vehicle Liability Insurance Minimum bodily injury limits of $500,000 per person, $1,000,000 per accident, and property damage limit of $1,000,000 per accident.

d. All Risk Insurance Covering all Contractor's equipment with a provision for Waiver of Subrogation against the Owner.

e. Excess Liability Insurance in Umbrella Form with combined Bodily Injury and Property Damage Limit of $ 1,000,000.

f. City of Waltham and JFF Design, Architects shall be listed as a NAMED Additional Insured with a Waiver of Subrogation on the insurance policy for this project.

1.26 SITE ACCESS

A. The General Contractor shall gain access to the site via routes approved by the Owner.

a. The General Contractor as part of the bid price will restore all roads, curbs, driveways, walks and grassed or landscaped areas damaged during construction.

1.27 CONSTRUCTION TRAILER

A. The General Contractor shall locate the construction trailer at locations approved by the Owner.

B. The General Contractor shall locate all on site stored or staged materials within the enclosed area designated by the Owner.

1.28 BUILDING PERMIT FEES

A. Building permit fees will not be waived for this project.

1.29 COMPLETE BID FORMS

A. Please Note: Each bidder must fill in all the blanks on all the bid forms, even if the information is "zero dollars" or "not applicable". Also, please acknowledge all Addenda even if they do not pertain to your trade.

Signature of Individual or Corporate Name
By:_____
(Signature of Corporate Officer if applicable)
Title:_____

Federal Identification Number:_____

END OF SECTION 00100

SECTION 00300 – FORM FOR GENERAL BID

A. General Bid Opening Date: 3:00 PM, June 13, 2012

B. BASE BID: Undersigned proposes to furnish all labor and materials required for the "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM," Waltham High School, 617 Lexington Street, Waltham, Massachusetts", in accordance with accompanying plans and specifications prepared by JFF Design, Architects, 24 Warwick Avenue, Waltham, MA 02452, dated May 30, 2012 for the contract price specified below, subject to additions and deductions according to terms of specifications.

C. CONTRACT PRICE:
The undersigned:

_____
(Please type or print the business name of the bidding firm)

having visited the site of the above project and having familiarized myself with the local conditions affecting the cost of the work and with the contract documents, including Amendments and Addenda No's. _____, hereby proposes to furnish all labor, materials, tools, equipment, insurance, permits and taxes, and to do and lawfully perform all things as provided in the specifications, all in accordance with the contract documents, for the sum of:

D. Base Bid (in words) Dollars,

$_____dollars and_____cents

($_____).

E. The subdivision of the proposed contract price is as follows:

a. Item 1. The work of the General Contractor, being all work other than that covered by Item 2. $_____

b. Item 2. Sub Bids as follows:

Sub-Trade	Number of Sub-Bidder	Amount	Bonds required indicated by "Yes" or "No"
MECHANICAL	_____	$_____	_____
ELECTRICAL	_____	$_____	_____
PLUMBING	_____	$_____	_____

Total of Item 2 $_____

F. ALTERNATES:

For Alternate No. 1 Add $_____ Deduct $_____
(Plumbing Filed Sub-Bid)

For Alternate No. 2 Add $_____ Deduct $_____
(HVAC Filed Sub-Bid)

G. UNIT PRICES: NOT USED

H. TIME OF COMPLETION: The undersigned agrees to commence work no later than July 5, 2012 but the space is available as early as June 16, 2012, providing notice to proceed has been issued by City of Waltham and to substantially complete the Work within one hundred eighty (180) consecutive calendar days (including Saturdays, Sundays and holidays). In the case the Work is not completed within the specified time, it is understood and agreed the General Contractor shall pay

the Owner, not as a penalty but as liquidated damages, the amount of $500 (five hundred dollars) for each calendar day after which completion was required up to and including the day of Substantial Completion.

I. CONTRACT: The undersigned agrees that, if he is selected as the General Contractor, he will, within five (5) days, Saturdays, Sundays and legal holidays included, after presentation thereof by the Awarding Authority, execute a Contract in accordance with the terms of this General Bid and furnish a Performance Bond and also a Labor and Materials or Payment Bond, each of a Surety Company qualified to do business under the laws of the Commonwealth of Massachusetts and satisfactory to the Awarding Authority, and each in the sum of 100% of the Contract Price, the premiums for which are to be paid by the General Contractor and are included in the Contract Price.

J. CERTIFICATE OF ELIGIBILITY: The undersigned has included with this Bid his Certificate of Eligibility and Update Statement as required by the General Laws.

K. NON-COLLUSION CERTIFICATION: The undersigned certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this Paragraph, the word "person" shall mean any natural person, joint venture, partnership, corporation, or any other business or legal entity.

L. FAMILIARITY WITH CONDITIONS: The undersigned represents that in regard to the conditions affecting the Work to be done and the labor and materials needed, this General Bid is based upon his familiarization with the site in conjunction with the Contract Drawings and Specifications and not on any oral or other representation of any employee, officer, agent or consultant of the Awarding Authority.

M. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that he will comply fully with all laws and regulations applicable to awards made subject to Section Forty-Four A.

N. TAXES: As required by MGL, Chapter 62C, s49A, the undersigned certifies the bidder has complied with all laws of the Commonwealth relating to taxes.

O. DEBARMENT: The undersigned further certifies under penalties of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated there under.

P. The undersigned as Bidder certifies that if this proposal is accepted, s/he will furnish to the City of Waltham with the invoice for the material or equipment supplied two copies of any and all Material Safety Data Sheets applicable to such material or equipment, as required by M.G.L. Chapter 111F, so called "Right to Know Law".

Q. The undersigned certifies under penalties of perjury that this bid is in all respects bonafide, fair and made without collusion or fraud with any other person. The word "person" shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity.

R. Substantial Completion

a. The work of the Contract shall be Substantially Completed in one hundred eighty (180) calendar days from the date of the "Notice to Proceed" and executed contract.

S. In accordance with M.G.L., the undersigned certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by OSHA that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

Date _____

_____
(Name of General Bidder)

By_____
(Name of Person Signing Bid and Title)

_____
(Business Address)

_____
(City, State and Zip Code)

_____ _____
(Telephone Number) (Fax Number)

(Seal, if Corporation)

By: _____
(If Corporation – Name and Office See also attached Certificate of Corporate Vote)

NOTE: This proposal must bear the written signature of the Bidder. If the Bidder is a partnership, the proposal must be signed by a partner. If the Bidder is a corporation, the proposal must be signed by a duly authorized officer or agent of such corporation. If the business owned by the individual or partnership is conducted under a trade or assumed name, a certified copy of doing business under an assumed name should be annexed.

Attached hereto and part of this bid proposal, are the following forms completed and signed:

1. DCAM (Form CQ7)
   Contractor shall obtain form from the Division of Capital Asset Management

2. DCAM Contractor Update Statement (Form CQ3)
   Contractor shall obtain form from the Division of Capital Asset Management

3. Bid Bond

4. Non-Collusion Affidavit

5. Certificate of Corporate Vote

6. Certification of Payment of State Taxes.

END OF SECTION 00300

NON-COLLUSION AFFIDAVIT

State of _____

County of _____

_____ being first duly sworn disposes and says that:

1. He / (She) is _____ of _____, the Bidder that has submitted the attached bid for the "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts"
2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or to fix any overhead, profit or cost element of the Bid price of the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Waltham or any person interested in the proposed Contract; and
5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agreements, representatives, owners, employees or parties in interest, including this affiant.

Signed _____
(title)

Subscribed and sworn before me

this _____ day of _____, 2012

_____

My commission expires:_____

CERTIFICATE OF VOTE

I, _____,

Clerk of _____
hereby certify that, at a meeting of the Board of Directors of said Corporation
duly held on _____ (Date must be earlier than date on contract)
at which a quorum was present and voting throughout, the following vote was duly passed and is now in full force and effect:

"VOTED": _____
(Name of Office authorized to sign for Corporation)

is hereby authorized, directed and empowered, in the name and on behalf of this Corporation, to sign, seal and with the corporate seal, execute, acknowledge and deliver all contracts, bonds and other obligations, and that such actions will be valid and binding upon this corporation for all purposes, and that a certificate of the Clerk of the corporation setting forth this vote shall be delivered to the City of Waltham and that this vote shall remain in full force and effect unless and until the same has been altered, amended or revoked by a subsequent vote of these directors. A certificate of such later vote of such directors be attested by the Clerk of this Corporation and delivered to the City of Waltham.

CERTIFICATE AS TO CORPORATE BIDDER

I, _____

certify that I am the _____

of the corporation named as bidder in the within bid form,

that _____,

who signed said bid form on behalf of the bidder was then _____ of said corporation, that I know his signature, that his signature thereto is genuine and that said bid form was duly signed, sealed and executed for and in behalf of said corporation by authority of its governing body.

(Corporate seal)

_____ _____
Secretary-Clerk Date

CERTIFICATION OF PAYMENT OF STATE TAXES

LEGISLATION ENACTED BY THE COMMONWEALTH OF MASSACHUSETTS EFFECTIVE JULY 1, 1983, REQUIRES THAT THE ATTESTATION BELOW BE SIGNED:

PURSUANT TO M.G.L. CH 62C, SEC. 49A, I CERTIFY UNDER PENALTIES OF PERJURY THAT I, TO THE BEST KNOWLEDGE AND BELIEF, HAVE FILED ALL STATE TAX RETURNS AND PAID ALL STATE TAXES REQUIRED UNDER LAW.

_____	_____
SOCIAL SECURITY NUMBER FEDERAL ID NUMBER	SIGNATURE OF INDIVIDUAL OR CORPORATE NAME

SECTION 00310 – FORM FOR SUB-BID _____

INSERT TRADE

A. Sub-Bid Opening Date: 10:00 AM, June 6, 2012

To all General Bidders except those hereinafter expressly excluded:

B. SUB-BID: Undersigned proposes to furnish all labor and materials required for their sub-trade category for the "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM," Waltham High School, 617 Lexington Street, Waltham, Massachusetts", in accordance with accompanying plans and specifications prepared by JFF Design, Architects, 24 Warwick Avenue, Waltham, MA 02452, dated May 30, 2012 for the contract price specified below, subject to additions and deductions according to terms of specifications.

C. SUB-BID CONTRACT PRICE:
The undersigned:

_____

(Please type or print the business name of the bidding firm)

having visited the site of the above project and having familiarized myself with the local conditions affecting the cost of the work and with the contract documents, including Amendments and Addenda No's. _____, hereby proposes to furnish all labor, materials, tools, equipment, insurance, permits and taxes, and to do and lawfully perform all things as provided in the specifications, all in accordance with the contract documents, for the sum of:

D. Sub-Bid (in words) Dollars,

$_____dollars and_____cents

($_____)

E. ALTERNATES:

For **Alternate No. 1** Add $_____ Deduct $_____
(Plumbing Filed Sub-Bid)

For **Alternate No. 2** Add $_____ Deduct $_____
(HVAC Filed Sub-Bid)

F. This sub-bid

[ ] May be used by any general bidder except:

_____

[ ] May only be used by the following general bidders:

_____

(To exclude general bidders, insert "X" in one box only and fill in blank following that box. Do not answer D if no general bidders are excluded.)

G. The undersigned agrees that, if he is selected as sub-bidder, he will, within five days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as the General Contractor, execute with such general bidder a subcontract in accordance with the terms of this sub-bid and contingent upon the execution of the general contract, and, if requested to do so in the general bid by such general bidder, who shall pay the premiums, furnish a

performance and payment bond of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority, in the full sum of the subcontract price.

H. The names of all persons, firms and corporations performing such class of work or part thereof for which the section of the specifications for the sub-trade require a listing in this paragraph (including the undersigned if customarily furnished by persons on his own payroll and in the absence of a contrary provision in the specifications), the name of each such class of work, or part thereof, and the bid price for each such class of work or part thereof are:

NAME	CLASS OF WORK	BID PRICE

(Do not give bid price for any class or part thereof furnished by undersigned.)

I. The undersigned agrees that the above list of bids to the undersigned represents a bonafide bid based on hereinbefore described plans, specifications, and addenda, and that, if the undersigned is awarded the contract, s/he will be used for the work indicated at the amounts stated, if satisfactory to the Awarding Authority.

J. The undersigned further agrees to be bound to the General Contractor by the terms of the hereinbefore described plans, specifications (including all general conditions stated therein), and addenda, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the Owner.

K. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all requirements of the plans and specifications:

1. Have been in business under present business name_____ years.
2. Have ever failed to complete any work awarded?_____
3. List three or more recent buildings with names of General Contractor and Architect on which you served as subcontractor for work of similar character as required for the above named buildings:

BUILDING	ARCHITECT	GENERAL CONTRACTOR	AMOUNT OF CONTRACT

4. Bank Reference: _____

L. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that he will comply fully with the laws and regulations applicable to awards of subcontractors subject to section 44 F of M.G.L. 149.

M. The undersigned further agrees that, if the undersigned fails to perform his agreement to execute a subcontract with the General Contractor and furnish a performance and payment bond if requested to do so in the general bid by the general bidder, the bid deposit accompanying the copy of this bid filed with the Award Authority shall become and be the property of the Awarding Authority as liquidated damages. The undersigned understands that, if he so executes a subcontract with the General Contractor and furnishes a performance and payment bond, if requested to do so, the bid deposit will be returned within five (5) days after execution of the general contract.

N. The undersigned represents that this proposal is made in good faith without fraud, collusion or connection of any kind with any other bidder for the same work, that the undersigned is competing solely on his own behalf without connection with, or obligation to, any undisclosed person or corporation, that no other person or corporation has any interest in the profits of the contract, that the undersigned has read the form of contract attached hereto and is fully informed in regard to all provisions thereof and to the plans and specifications therein referred to, and that the undersigned has visited the premises described in said form of contract and made his own examination of the place where the work is to be done and of all conditions pertaining to the work and has made his own estimate and from such examination and estimate makes this proposal.

O. The Federal Social Security Identification Number of the sub-bidder (the number used on Employer's Quarterly Federal Tax Return, US Treasury Department Form 941) is:

_____

P. In accordance with M.G.L., the undersigned certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by OSHA that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

DATE: _____

Sub Bidder: _____
(Company Name)

By: _____
Signature of Authorized Representative

Title: _____
(Affix Seal)

Business Address: _____

City and State: _____

Telephone No. _____

NON-COLLUSION AFFIDAVIT

State of _____

County of _____

_____ being first duly sworn disposes and says that:

1. He / (She) is _____ of _____, the Sub-Bidder that has submitted the attached SUB-BID for the "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts"
2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such SUB-BID is genuine and is not a collusive or sham Bid;
4. Neither the said Sub-Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Sub-Bidder, firm or person to submit a collusive or sham Bid in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Sub-Bidder, firm or person to fix the price or prices in the attached Sub-Bid or to fix any overhead, profit or cost element of the Sub-Bid price of the Sub-Bid price of any other Sub-Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Waltham or any person interested in the proposed Contract; and
5. The price or prices quoted in the attached Sub-Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Sub-Bidder or any of its agreements, representatives, owners, employees or parties in interest, including this affiant.

Signed _____
(title)

Subscribed and sworn before me

this _____ day of _____, 2012

_____

My commission expires:_____

CERTIFICATE OF VOTE

I, _____,

Clerk of _____

hereby certify that, at a meeting of the Board of Directors of said Corporation duly held on

_____ (Date must be earlier than date on contract)

at which a quorum was present and voting throughout, the following vote was duly passed and is now in full force and effect:

"VOTED": _____
(Name of Office authorized to sign for Corporation)

is hereby authorized, directed and empowered, in the name and on behalf of this Corporation, to sign, seal and with the corporate seal, execute, acknowledge and deliver all contracts, bonds and other obligations, and that such actions will be valid and binding upon this corporation for all purposes, and that a certificate of the Clerk of the corporation setting forth this vote shall be delivered to the City of Waltham and that this vote shall remain in full force and effect unless and until the same has been altered, amended or revoked by a subsequent vote of these directors. A certificate of such later vote of such directors be attested by the Clerk of this Corporation and delivered to the City of Waltham.

CERTIFICATE AS TO CORPORATE SUB-BIDDER

I, _____

certify that I am the _____

of the corporation named as sub-bidder in the within sub-bid form,

that _____,

who signed said sub-bid form on behalf of the sub-bidder was then _____ of said corporation, that I know his signature, that his signature thereto is genuine and that said sub-bid form was duly signed, sealed and executed for and in behalf of said corporation by authority of its governing body.

(Corporate seal)

_____ _____
Secretary-Clerk Date

CERTIFICATION OF PAYMENT OF STATE TAXES

LEGISLATION ENACTED BY THE COMMONWEALTH OF MASSACHUSETTS EFFECTIVE JULY 1, 1983, REQUIRES THAT THE ATTESTATION BELOW BE SIGNED:

PURSUANT TO M.G.L. CH 62C, SEC. 49A, I CERTIFY UNDER PENALTIES OF PERJURY THAT I, TO THE BEST KNOWLEDGE AND BELIEF, HAVE FILED ALL STATE TAX RETURNS AND PAID ALL STATE TAXES REQUIRED UNDER LAW.

_____	_____
SOCIAL SECURITY NUMBER FEDERAL ID NUMBER	SIGNATURE OF INDIVIDUAL OR CORPORATE NAME

SECTION 00410 – GENERAL BID BOND FORM

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

_____ as Principal, and

_____ as Surety,

are hereby held and firmly bound unto the

_____, _____, _____, as Owner, in the penal sum of

_____ for the payment for which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this ____day of _____, 20____.

The Condition of the above obligation is such that whereas the Principal has submitted to the _____, a certain General Bid, attached hereto and hereby mead a part hereof, to enter into a Contract in writing for the "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts".

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,
(b) If said bid shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all respects perform the Agreement created by acceptance of said Bid,

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby, stipulates and agrees that the obligations of said Surety and its' bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)

_____
Principal

By _____
Surety

By _____

END OF SECTION 00410

SECTION 00420 – SUB-BID BOND FORM

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

_____ as Principal, and

_____ as Surety,

are hereby held and firmly bound unto the

_____, _____, _____, as Owner, in the penal sum of

_____ for the payment for which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this ____day of _____, 20____.

The Condition of the above obligation is such that whereas the Principal has submitted to the _____, a certain Sub-Bid, attached hereto and hereby mead a part hereof, to enter into a Contract in writing for the "CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCER ROOM" Waltham High School, 617 Lexington Street, Waltham, Massachusetts".

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,
(b) If said bid shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all respects perform the Agreement created by acceptance of said Bid,

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby, stipulates and agrees that the obligations of said Surety and its' bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)

_____
Principal

By _____
Surety

By _____

END OF SECTION 00420

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

1.2 INFORMATION

A. All information shall come from the Office of the City Purchasing Agent. The Contractor shall inquire at this office for any information needed. Wherever the words "or equal as approved" are used, it is to be understood that the opinion of the City Purchasing Agent shall govern.

1.3 SUITS

A. The Contractor shall assume defense of and shall indemnify and hold the City and its agents harmless from all suits and claims against the City and its sub-contractors arising from the use of any invention, patent right labor or employment, or from any act of omission or neglect of the City, its agents, employees or any subcontractor in performing the work, under this contract.

1.4 LAWS AND REGULATIONS

A. The Contractor shall conform to all the applicable rules, regulations, laws and ordinances of the City of Waltham, the Commonwealth of Massachusetts, the United States of America and all agencies having jurisdiction over this contract.

1.5 PROTECTION OF PROPERTY

A. The Contractor shall take all proper precautions to protect the City's property from damage and unnecessary inconvenience. Any City property damaged by the Contractor in carrying out the provisions of this contract shall be restored to its original condition, by and at the expense of the Contractor.

1.6 PROTECTION OF PERSONS

A. The Contractor shall take all proper precautions to protect persons from injury, unnecessary inconvenience, and shall be responsible for his failure to do so. The Contractor agrees to hold the City harmless from any and all liabilities of every nature and description, which may be suffered through bodily injury, including death, to any person, by reason of negligence of the Contractor, his agents or employees, or any subcontractor.

1.7 CONTRACT DURATION.

1.8 The work shall commence at the time stated in the notice to the Contractor to proceed by the City of Waltham and shall be substantially completed within one hundred eighty (180) consecutive calendar days. Notice to proceed may be given to the Bidder on any date after the Bidder has executed the contract and furnished the performance and payment bonds with all insurance herein requested.

1.9 INSURANCE

A. WORKMAN'S COMPENSATION: The Contractor shall provide by insurance for the payment of compensation and furnishing of other benefits under Chapter 152 of the General Laws of the Commonwealth of Massachusetts to all persons to be employed under this contract, the premiums for which shall be paid by the Contractor.

B. COMPREHENSIVE GENERAL LIABILITY

Bodily Injury:	$1,000,000 Each Occurrence
	$2,000,000 Aggregate
Property Damage:	$1,000,000 Each Occurrence
	$2,000,000 Aggregate

C. AUTOMOBILE (VEHICLE) LIABILITY

Bodily Injury	$2,000,000 Each Occurrence
Property Damage	$1,000,000 Aggregate

D. UMBRELLA POLICY

General liability	$2,000,000

E. Your bid response must include a Certificate of Insurance with the above limits as a minimum. In addition, the Certificate of Insurance must have the following text contained in the bottom left box of the Certificate:

"The City of Waltham is a Named Additional Insured for all Insurance"

1. The Certificate of Insurance must be mailed directly to:

   Office of the Purchasing Agent
   Purchasing Department
   City of Waltham
   610 Main Street
   Waltham, MA 02452

1.10 LABOR AND MATERIALS BOND

A. The Contractor agrees to execute and deliver to the City, a Labor and Materials or Payment Bond equal to 100% of the contract value. This contract shall not be in force until said bond has been delivered and accepted by the City. Bond to be issued by a company licensed by the Commonwealth of Massachusetts.

B. A LETTER FROM A SURETY COMPANY CERTIFYING THAT THE CONTRACTOR IS QUALIFIED AND CAPABLE OF OBTAINING THE ABOVE BONDS MUST BE INCLUDED WITH HIS/HERS BID.

1.11 PERSONNEL:

A. The Contractor shall employ a competent supervisor and all properly licensed personnel necessary to perform the services required in this contract. The City Purchasing Agent shall have the right to require the Contractor to remove and/or replace any of the personnel for nonperformance or for unprofessional behavior. The City Purchasing Agent may require the Contractor to submit a weekly performance record of the areas and of the work performed, on forms approved by the City Purchasing Agent. The Contractor or his supervisor shall be available to inspect such work as required by the City Purchasing Agent.

1.12 PREVAILING WAGES

A. The Contractor is required to pay the prevailing wages as determined under the provisions of Chapter 149, Sections 26 and 27D of the Massachusetts General Laws, including the submission of weekly payrolls to the awarding authority. The prevailing wage schedule is available on line at www.city.waltham.ma.us/open-bids or via e-mail request to jpedulla@city.waltham.ma.us .

1.13 MATERIALS

A. The City or its Agent reserves the right to approve or reject any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any rejected supplies, materials or equipment, to the satisfaction of the City or its Agents.

1.14 TERMINATION OF CONTRACT

A. This contract may be terminated by the City upon deliverance to the Contractor of a five-day written notice of said termination.

1.15 CONTRACT OBLIGATIONS

A. Contract obligations on behalf of the City are subject to an annual appropriation to cover the contract obligation.

1.16 BIDDER EXPERIENCE EVALUATION

A. Each bidder shall submit with his bid, all the information relative to their experience and qualifications in performing the work required under this contract and shall have been in business for a minimum of five (5) years, in order for their bid to be considered.

1.17 NOT-TO-EXCEED AMOUNT

A. The bid amount proposed in your company's response is a "not-to- Exceed" amount unless the City makes changes, in writing, to the scope of work to be performed. The Change Order must be signed and approved by the City's Purchasing Agent, City Auditor, Law Department and the Mayor prior to the commencement of the change order work. No work is to begin until the proper approvals have been obtained. A change order will be priced at the unit price. Failure to comply with this procedure will result in the cancellation of the contract and the non-payment of services provided

1.18 FINANCIAL STATEMENTS.

A. The City may require, within five (5) days after the bid opening, a complete and detailed Financial Statement prepared by a Certified Public Account, to determine a bidder's financial stability.

1.19 BREACH OF CONTRACT/ NON PERFORMANCE

A. If the Contractor shall provide services in a manner, which is not to the satisfaction of the City, the City may request that the Contractor refurnish services at no additional cost to the City until approved by the City. If the Contractor shall fail to provide services, which are satisfactory to the City, the City in the alternative may make any reasonable purchase or Contract to purchase services in substitution for those due from the Contractor. The City may deduct the cost of any substitute Contract for nonperformance of services together with incidental and consequential damages from the Contract price and shall withhold such damages from sums due or to become due to the Contractor. If the damages sustained by the City exceed sums due or to become due, the Contractor shall pay the difference to the City upon demand. The Contractor shall not be liable for any damages sustained by the

City due to the Contractor's failure to furnish services under the terms of this Contract if such failure is in fact caused by the occurrence of a contingency the nonoccurrence of which was a basic assumption under which this Contract was made, including a state of war, embargoes, expropriation of labor strike or any unanticipated federal, state or municipal governmental regulation of order, provided that the Contractor has notified the City in writing of such cause within seven (7) days after its occurrence.

1.20 RIGHT TO AUDIT

A. The City of Waltham has the right to review and audit documents related to this contract. This right extends to any subcontractor, supplier or other entity used by the prime contractor to fulfill the obligations under this contract.

1.21 CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

A. All contract made by any department, board or commission where the amount involved is two thousand dollars ($2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars ($5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

1.22 BID OPENING INCLEMENT WEATHER

A. If, at the time of the originally scheduled bid opening, City Hall is closed to inclement weather or another unforeseeable event, the bid opening will be extended until 2:00 PM on the next normal business day. Bids will be accepted until that date and time.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 00700

ATTACHMENT A
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned
_____
a corporation organized under the laws of _____and having a usual place of business in _____, in the County of _____ and the State of_____ as PRINCIPAL, and _____a corporation organized under the laws of _____, and having a usual place of business of_____, in the County of _____, Massachusetts, as SURETY, are firmly held and bound unto the City of Waltham as OBLIGEE, in the sum of_____ DOLLARS ($_____) lawful money of the United States of America, for payment of which well and truly to be made, we hereby, jointly and severally, bind ourselves and our respective heirs, executors, administrators, successors and assigns, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated_____, 20__, for construction of the _____, _____, _____, which Contract in its entirety, including the General Conditions, Drawings, Specifications, and any Addenda is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of said contract and any extensions thereof that may be granted by the Obligee, with or without notice to the Surety, and during the life of any guarantee required under the Contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the Surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void, otherwise it shall remain in full force and effect.

In the event that the contract is abandoned by the Principal, or in the event that the Obligee, under the provisions of Article 14 of the General Conditions of said Contract, the Contract, said Surety hereby further agrees that said Surety shall, if required in writing by the Obligee, take such action as is necessary to complete said Contract.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, or agents, this

_____day of _____, 20____.

ATTEST

_____
(Principal)

By:_____ _____
(Title)
SEAL

_____
Surety

By _____ _____
(Attorney in Fact)
SEAL

END OF DOCUMENT

ATTACHMENT B
LABOR AND MATERIALS PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

_____

a corporation organized under the laws of _____and having a usual place of business in

_____, in the County of _____ and the State of_____

as PRINCIPAL, and _____a corporation organized under the laws

of _____, and having a usual place of business of_____,

in the County of _____, Massachusetts, as SURETY, are firmly held and bound unto

the City of Waltham as OBLIGEE, in the sum of_____

DOLLARS ($_____) lawful money of the United States of America, for payment of which well and truly to be made, we hereby, jointly and severally, bind ourselves and our respective heirs, executors, administrators, successors and assigns, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated_____, 20__, for construction of the:

"CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCER ROOM"
Waltham High School, 617 Lexington Street, Waltham, Massachusetts

which Contract in its entirety, including the General Conditions, Drawings, Specifications, and any Addenda is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW THEREFORE, the condition of this obligation is such that if the Principal and each Sub-contractor shall pay for labor performed or furnished and materials used or employed in such construction, including lumber so employed which is not incorporated therein and is not wholly or necessarily consumed or made so worthless as to lose its identity, but only to the extent of its purchase price less its fair salvage value, and including also any material specially fabricated at the order of the Principal or Sub-contractor for use as a component part of said building so as to be unsuitable for use to the extent of its purchase price less its fair salvage value and only to the extent that such specially fabricated material is in conformity with the Contract Drawings and Specifications or any changes therein duly made; and shall pay transportation charges for materials used or employed therein, which are consigned to the Principal or to a Sub-contractor who has a direct contractual relationship with the Principal; and shall pay any sums due for the rental or hire of vehicles, steam shovels, rollers propelled by steam or other power, concrete mixers, tools, and other appliances and equipment employed in such construction; and shall pay transportation charges directly related to such rental or hire; and shall pay any sums due trustees or other persons authorized to collect such payments from the Principal or Sub-contractors, based upon the labor performed or furnished as aforesaid for health and welfare plans, supplementary unemployment benefit plans, and other fringe benefits which are payable in cash and Sub-contractors, all in accordance with the provisions of the General Laws, Chapter 149, Section 29, and other sections of said Chapter and all acts amendatory thereof or supplementary thereto (this bond being in compliance with the requirements of said Chapter to furnish security thereunder), then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition, to the terms of the Contract or to the Work to be performed thereunder or the Drawings and Specifications accompanying the same shall in any way affect its obligations on this bond, and it does

hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Drawings and Specifications.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, or agents, this

_____day of _____, 20____.

ATTEST

_____
(Principal)

By:_____ _____
(Title)
SEAL

_____
Surety

By _____ _____
(Attorney in Fact)
SEAL

END OF DOCUMENT

SECTION 00700C – 10 HOURS OSHA TRAINING CONFIRMATION

Chapter 306 of the Acts of 2004

CONSTRUCTION PROJECTS
AN ACT RELATIVE TO THE HEALTH AND SAFETY ON PUBLIC

The undersigned hereby certifies that all employees to be employed at a worksite for construction, reconstruction, alteration, remodeling, repair, installation, demolition, maintenance or repair of any public work or any public building estimated to cost more than $10,000.00 have successfully completed a course in construction safety and health approved by the **United States Occupational Safety and Health Administration** that is at least **10 hours** in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first payroll report for each employee and will comply with all laws and regulations applicable to awards of subcontracts subject to section 44F.

Company Name:_____

Address:_____

Signature:_____

Title:_____

Print Name_____

See following Chapter 306 of the Acts of 2004

END OF SECTION 00700C

ATTACHMENT 'D'

CLASSIFICATION AND PREVAILING WAGE RATES

The prevailing wage schedule is available upon request in the office of the Purchasing Agent. Email your request to jpedulla@city.waltham.ma.us

SECTION 01010 – PROJECT PROCEDURES

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section
B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Permits and Fees
B. Sales and use tax exemption
C. Contractor's use of premises
D. Contract Conditions
E. Use and occupancy prior to acceptance
F. Field engineering
G. Project Coordination and Coordination Drawings
H. Traffic Control and Parking
I. Project Environmental Controls
J. Construction Documents
K. Project Superintendent
L. Municipal Police and Fire
M. Worker Conduce, Appearance and Rules
N. Maintain Owner's Occupancy Requirements

1.3 RELATED SECTIONS

A. Section 1027 – APPLICATION FOR PAYMENT
B. Section 01040 – COORDINATION
C. Section 01720 – RECORD DOCUMENTS

1.4 PERMITS AND FEES

A. Contractor shall obtain all permits required, by the City and State, for the Work.

B. Owner will not pay for the building permit. All permit fees required by the City of Waltham, including by not limited to, Building Permit, Board of Health, Electricity, Plumbing shall be the responsibility of the General Contractor and each individual Sub-Bidder under whose trade the permit is responsible.

C. Contractor shall pay for all other governmental fees and licenses for the Work.

1.5 SALES AND USE TAX EXEMPTION

A. Owner is exempt from payment of sales and use taxes levied by the Commonwealth of Massachusetts. All contract costs shall reflect this exemption.

B. Owner will furnish tax emption certificate and number to General Contractor for use by all trades in purchasing material for the Work.

C. The General Contractor shall:

1. Place exemption certificate number on invoices for material incorporated in the Work.
2. Furnish copies of invoices to Owner. Upon completion of the Work, file with the Owner a notarized statement that all purchases made under exemption certificate were entitled to be exempt.
3. Pay legally assessed penalties for improper use of exemption certificate number.

1.6 CONTRACTOR USE OF PREMISES

A. The Contract Site shall be as shown of the Drawings for each area of work and shall include the entire area bound by the "Contract Limit" lines as well as all areas outside of the Limit of Work Lines when required for performance of work under this Contract.

B. The right of Possession of the premises, and the improvements made thereon, shall remain with the Owner at all times. The Contractor's Right of Entry and the use thereof arises solely from the permission granted by the Owner under the Contract Documents.

C. Damage to existing work caused by operations under this Contract shall be repaired at Contractor's expense.

D. Any street, paving, curb and/or sidewalk damaged as the result of work under this Contract, whether within or outside the limits of the Work, shall be repaired and/or replaced under this Contract, in a timely fashion, with new matching construction.

E. Where crossing over existing curbs or walks, they shall be suitably protected in an approved manner.

F. Provide continuous, lawful, safe, adequate and convenient access to the site. Contractor's access to the site will at times include existing roadways and paved surfaces that Contractor shall maintain and restore to original condition. Contractor shall construct and maintain throughout the project in good useable condition temporary roads and appurtenances as required.

G. The General Contractor and all Sub-contractors shall confine operations at the site to areas permitted by the contract schedule work areas as herein specified, law and ordinances, permits and Contract limit lines.

H. General Contractor shall be solely and entirely responsible for the design and construction of any and all temporary facilities to be used by the public during the course of work under this Contract. Such facilities shall be designed by a Professional Architect / Engineer registered in Massachusetts who shall be retained by the Contractor for this purpose. Contractor shall submit Architect/Engineer's written certification that all such facilities have been designed and constructed in a safe and substantial manner for public use and in accordance with all applicable codes.

I. Do not unreasonably encumber the site with materials or equipment.

J. Assume full responsibility for protection and safekeeping of product stored on premises. Obtain and pay for use of additional storage or work areas needed for operations. Limit use of site to work and storage. Move any stored products which interfere with operations of Owner or other contractors.

1.7 CONTRACT CONDITIONS

A. This Contract is subject to applicable Federal, State and local laws and regulations. Where any requirements contained herein do not conform to statutes governing the Work of this Contract, the statutes shall govern.

B. This project is subject to compliance with Public Law 91-596, "Occupational Safety and Health Act of 1970" (OSHA), as amended, with respect to all rules and regulations pertaining to construction, including Volume 36, numbers 75 and 105, of the Federal Register, as amended, and as published by the US Department of Labor.

C. Each and every provision of law and clause required by law to be inserted into this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if, through mistake or otherwise, any such provision is not inserted, or is not correctly inserted, then upon application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

D. Attention is directed to recent amendments to MGL C.149, Section 27B requiring submission of certified weekly payrolls to the Awarding Authority by every contractor and subcontractor doing public work.

1.8 USE AND OCCUPANCY PRIOR TO ACCEPTANCE

A. The Owner reserves the right to occupy and to place and install equipment in completed areas of the Work prior to the date of Substantial Completion as stipulated in the Agreement, provided such occupancy does not interfere with completion of the Work. Such occupancy or placement of equipment shall not constitute acceptance of the Work.

1. The Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner occupancy.

2. Upon Occupancy, the Owner will assume responsibility for maintenance for occupied portions of the site.

B. If the Project has not been substantially completed by the specified date, the Owner, at his election, may from time to time occupy the site or any portion of the site as the Work in connection therewith is completed to such a degree as will, in the opinion of the Owner, permit the use of the site for construction of the building. Such occupancy shall not constitute acceptance of the Work.

C. The Owner will, prior to any such partial occupancy, give notice to the General Contractor thereof and such occupancy shall be predicated upon the following conditions:

1. In case of partial occupancy prior to the stipulated completion date, the Owner shall secure endorsement from the insurance carrier and consent of the Surety permitting occupancy of the site during the remaining period of construction.

2. In case of partial occupancy after the stipulated date, the General Contractor shall extend all necessary insurance coverage until Final Acceptance of the Project. Owner's use and occupancy prior to Final Acceptance shall not relieve the General Contractor of his responsibility to maintain the insurance coverage required by the Contract Documents.

3. In case of such partial occupancy, guarantee periods called for by the Contract Documents shall not commence until Substantial Completion of all work under this Contract.

D. Occupancy of the site or any portion thereof by the Owner shall not relieve General Contractor of the responsibility to perform all work required by Contract Documents but not completed at the time of occupancy.

1.9 PROJECT COORDINATION AND COORDINATION DRAWINGS

A. Coordination: General Contractor shall be fully responsible for coordinating all trades, coordinating construction sequences and schedules, and coordinating the actual installed location and interface of all work.

B. Sequence and Scheduling of Work: Schedule, deliver and install items of work in the optimum sequence to ensure the complete and correct interface of all work, to avoid cutting and patching and to avoid damage to finished work.

C. Coordinate Modifications to the Work: Fully coordinate all modifications to the work including without limitation: 1) changes which affect Contract Price, 2) changes which do not affect Contract Price, 3) substitutions, 4) Contractor's selection when given optional choices, and 5) other modifications and changes. Coordinate and provide all other work required to implement the modification at no additional cost to Owner.

1.10 PROJECT ENVIRONMENTAL CONTROLS

A. Regular clean-up: Daily clean-up of all waste, remove from site regularly, and legally dispose of offsite. Keep premises clean, neat, orderly and safe with proper working conditions at all times. Frequency of waste removal shall be as approved by the Owner and authorities having jurisdiction.

1. Adjacent Areas: Keep adjacent areas, neighboring properties, streets, public ways, and all areas clean, safe, and free of construction debris and dirt including wind-blown debris. Comply with local ordinances and requirements of authorities having jurisdiction.

2. Trucking: Do not over load trucks and dumpsters. Cover open trucks and dumpsters to control wind-blown dust and debris.

3. Dust Control: Make effective efforts to control dust. Wet travel areas, debris stockpiles, and other work to control dust. Do not create ice hazards in cold weather. Cover stockpiles with weighted tarpaulins. Stop operations which cause objectionable dust until effective dust control procedures are established. Provide protective covering of interior areas used to cut tile isolating the dust to a single location and not so to affect the safety and welfare of the occupants. Clean this area daily and keep any sharp cutoffs away from inhabitants.

1.11 CONSTRUCTION DOCUMENTS

A. The Contractor shall be entitled to receive, without additional charge, five (5) complete sets of the Contract Documents, including Drawings and Specifications, for use during the construction period. These copies shall be in addition to those furnished for bidding purposes.

B. The two (2) sets required for Record Drawings are not included in the above sets to be furnished by the Owner.

C. Extra sets returned by bidders and not required for other purposes, as determined by the Architect, will be made available to Contractor for the Work.

D. All other copies of the Contract Documents required by the Contractor for use during the construction period shall be purchased and paid for by the party requiring the same. The Architect will furnish approximate costs of such additional copies and will transmit originals to local printing companies with whom he regularly does business, but will not receive bills for such printing through his account. All negotiations for such printing shall be between the Contractor and the Printer.

1.12 PROJECT SUPERINTENDENT

A. The Contractor shall employ an experienced, full time, licensed Project Superintendent to provide supervision and management on site whenever work is in progress, except for reasonable absences such as personal vacation or illness.

B. Owner Approval: Employ a Project Superintendent approved by the Owner. Do not reassign or replace the superintendent during the project without the Owner's consent. Reassignment or replacement of the superintendent without the Owner's consent shall be a breach of the Contract. The Owner's consent shall not be unreasonably withheld. If the Contractor is permitted by Owner to reassign or replace the superintendent it shall result in a One Thousand Dollar ($1,000.00) penalty per incident which shall cover the Architect's time to re-orient new personnel.

C. Reassignment and/or Replacement: If requested by the Owner, the Contractor shall remove and replace the Project Superintendent with no change to the Contract.

1.13 WORKER CONDUCT, APPEARANCE AND RULES

A. Worker Conduct, Appearance and Rules: Because this project is within an occupied school, the conduct of each worker at the job site is of paramount importance. The Owner reserves the right to require any worker to be banished from the Owner's property.

1. Privacy: Conduct all work of the Contract shall be accomplished with the maximum effort to maintain the privacy of the Owner's operations, staff and students. Do not permit workers to peer into areas outside of the immediate work area and of the existing building visible from the work area. Invasion of privacy is a major infraction of the work rules.

2. General Conduct and Demeanor: All construction workers shall treat the Owner's staff, students and the public professionally with respect and courtesy. Appropriate work attire is required. Foul language and loud conduce are prohibited.
3. Radios and Television: The use of entertainment devices including personal devices with headphones or earphones is strictly prohibited at all times. Control the volume of communication radios and loudspeakers to avoid creating a nuisance.
4. Smoking: Smoking is strictly prohibited on school property.
5. Sexual Harassment: All forms of physical and verbal sexual harassment including, without limitation; touching, whistling, sexually explicit stories, jokes, drawings, photos, and representations; exhibitionism; and all other sexually oriented offensive behavior is strictly prohibited and is a major infraction of the work rules.
6. Student Contact: Except for necessary warnings and safety related instructions, construction personnel are strictly prohibited from having any direct or indirect contact with students including, without limitation; verbal or written communication, touching, staring, whistling, howling, and any other action or behavior which makes a student uncomfortable or which could be interpreted by the student as harassment. A violation of this type may be considered, on a case-by-case basis, as a major infraction of the work rules.
7. Warnings and Dismissals: For minor infractions of the rules, the Owner may issue a warning. Only one warning will be allowed per worker from the Owner's property. For major infractions of the work rules, the worker shall be dismissed immediately without prior warning and possibly subject to criminal prosecution.
8. Recommendation: The Owner recommends that the Contractor notify each worker of the work rules in writing and obtain signed acknowledgement of the worker's understanding of the work rules as a condition of employment on this project.
9. Identification: Install project identification and other signs in locations approved by Owner to inform the public and persons seeking entrance to Project. All persons working on the premises will wear photo id name tags at all times and will sign in with the administration desk located in the main entry of the school at the beginning of each work day.
10. All workers on school property are required to have a Waltham Public School Department issued CORI form processed. The Waltham Public School Department, through the Superintendent's Office, will process all CORI forms. All on-site workers are personally required to visit (in person) the Superintendent's Office, 781-314-5400, with a driver's license or government issued identification upon issuance of contract. All fees are to be borne by the City of Waltham School Department. No on-site worker will be allowed to work on the project without first completing this CORI form and it is completely processed.

1.14 MAINTAIN OWNER OCCUPANCY REQUIREMENTS

A. Maintain Owner Occupancy: Maintain the Owner's occupancy throughout the Contract.

1. Perform work of the Contract with the least disturbance to the Owner's normal operations.
2. Do not interfere with the Owner's normal business.
3. Perform work of the Contract without damage to or loss of the Owner's property.
4. Avoid creating a nuisance.
5. Minimize disturbance to building occupants.

B. Conflicts: Coordinate Contract operations with the Owner to avoid conflicts. In all cases of conflict, the Owner's operations and business shall have priority.

C. Temporary Suspension or Relocation of Work to Accommodate Owner: The Owner will direct its' personnel to communicate with the Contractor through the Architect. In the event of an emergency or other urgent need, the Owner's personnel may communicate with the Contractor directly.

1. If any of the Owner's personnel request the work to stop in any area for any reason, immediately contact the Architect and request direction.
2. If the Architect cannot be reached immediately, stop the offending work in that area and continue with non-offending work or relocate work to other areas to avoid project delays.

3. Since this accommodation of the Owner's needs and operations is inherently part of the Contract and inherently required to avoid conflict with the Owner's operations, no additional payments or change in the Contract Amount will be paid for this type of accommodation of the Owner's needs.

D. Work Limits: Restrict Contract related materials, debris, equipment, personnel, temporary facilities, and operations to within "work limits" indicated or approved by the Owner. The "work limits" approved by the Owner define the demarcation between Contractor operations and Owner operations. The "work limits" do not change the requirements of the contract that may include work outside the "work limits." Adequate barriers and signage shall be maintained at all times during the work day and after hours.

E. Utilities, Services and Interruptions: Do not interrupt any services, utilities, or facilities serving Owner occupied areas in the existing school. Protect and maintain all utilities and services serving the Owner occupied areas including, without limitation, power, water, fire protection, alarms and communications.

1. Switches and Breakers: Do not turn any switches, breakers, or equipment "on" or "off" without fully understanding the consequences and without first obtaining the Owner's written approval.

2. Contractor's Responsibility: Be responsible for all damage and injury resulting from work on or near utilities and services, and all costs to restore and repair utilities and all costs for temporary replacement utilities.

F. Contractor Circulation Routes: Restrict Contract related traffic and circulation only to site entrances, building entrances, and circulation paths pre-approved by Owner.

G. Owner's Equipment: Do not use any equipment belonging to the Owner. If the Contractor or any Sub-contractor uses the Owner's equipment with or without the Owner's permission, the Contractor shall indemnify and hold the Owner harmless for damages or losses which the Owner may suffer due to any damage or injury, including death, to any person or to any property, sustained or alleged to have been sustained. The term "damages or losses" shall include all awards, court costs, litigation expenses, attorney's fees, and other costs in connection with the damage or losses. The agreement to indemnify the Owner shall survive termination of the Owner-Contractor Agreement for Construction.

H. Noise and Exhaust Fumes from Vehicles, Engines, Machines, and Equipment: Do not operate any vehicle, machinery, equipment, or engine less than 50 feet from the nearest Owner occupied area, except where specific prior written permission has been obtained from the Owner or Architect.

1. To the greatest extent possible, position vehicles, machines, equipment, and engines so the engine exhaust is directed away from the Owner occupied areas. Vehicle engine idling will not be permitted for delivery vehicles or any other vehicles other than those engaged in mechanical operation for worker purpose.

2. Use only vehicles, machines, equipment, and engines with acoustically insulated metal covers over noise producing components.

3. For stationary vehicles, machinery, equipment, or engines, provide temporary sound barrier at least 8 feet high and extending at least 3 feet beyond the horizontal limits of the noise producing source (minimum 8 feet horizontal width) to help direct sound away from Owner occupied areas. Make the sound barrier larger as needed. Effectively interrupt all direct lines of sight from the noise source to the Owner occupied areas.

1.15 PRODUCTS (Not Applicable)

1.16 EXECUTION (Not Applicable)

END OF SECTION 01010

SECTION 01027 – APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Procedures for preparation of submittal of Applications for Payment.

1.3 RELATED SECTIONS

A. Document 00700: GENERAL CONDITIONS: Progress payments, retainages, and times for submittals and final payment.

B. Document 01300: SUBMITTALS: Submittal procedures and Schedule of Values.

C. Section 01700: CLOSEOUT PROCEDURES

1.4 APPLICATION FOR PAYMENT

A. Schedule of Values: Within ten (10) calendar days after contract award and no less than fifteen working days prior to the first application for payment, prepare and submit a detailed Schedule of Values and Cash Flow Schedule to coordinate with the Application for Payment breakdown. Provide information required in format acceptable to the Architect, in both hard-copy and electronic format (the electronic format shall be in the latest version of Microsoft Excel or other format acceptable to both parties). Provide additional breakdowns and substantiation for costs as requested by the Owner or Architect. List each major item of work and all minor items as additionally requested by the Architect, showing quantities and unit values. Provide a separate page for each major item of work generally following the specification section breakdown, and one page summary sheet for the entire project. Provide support data to substantiate the accuracy of the submitted information. Do not change the Schedule of Values without written permission from the Architect.

B. Cash Flow Schedule: The Contractor shall provide a Cash Flow Schedule projecting the Contractor's anticipated total monthly requisitions for each month of the project from start to Substantial Completion. Update and reissue the Cash Flow Schedule in coordination with each monthly Application for Payment.

C. Submit Application for Payment to the Architect in accordance with the schedule established in the General Conditions Contract for Construction.

D. Submit itemized application typed on AIA Document G702, "Application and Certificate for Payment," and Continuation Sheet G703 or on other forms approved by the Architect.

E. Line items and dollar values shall be from the Schedule of Values accepted by the Architect.

F. Include all trades and amounts for Sub-contractors.

G. Overhead and profit shall be a separate line item each month for the Contractor on its' G703 sheets.

1.5 PREPARATION OF APPLICATION

A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to the date of submittal of application. List each authorized Change Order as an extension on the continuation sheet, listing Change Order number and dollar amount as for an original item of work.
2. Fill in summary of dollar values to agree with the respective totals indicated on the Continuation Sheets.
3. Execute certification with the signature of an authorized officer of the Contractor's firm.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of work, with item number and the scheduled dollar value for each item.
2. Fill in the dollar value in each column for each scheduled line item when work has been performed or products stored as approved. Round off values to the nearest dollar, unless otherwise specified for the schedule of values.
3. List each Change Order executed prior to the date of submission, at the end of the Continuation Sheets. List by Change Order Number, description, and breakdown of costs as for an original component item of work.

C. Progress Payment Application Attachments: The application shall not be deemed complete and shall be returned to the Contractor if not accompanied by the following: Progress Schedule, current Schedule of Values, Cash Flow Schedule, Certificate to all Sub-contractors per MGL C30, Section 39F.

D. Additional First Payment Application Requirement:

1. List of Sub-contractors, Suppliers, and Fabricators including name, address and telephone numbers of responsible parties.
2. Final Schedule of Values and Cash Flow Schedules.
3. Progress Schedule
4. Complete, detailed Submittal schedule keyed into Project Schedule.
5. List of Contractor's Key project personnel including names, home addresses, and home telephone numbers.
6. Copies of Permits and all other communications from authorities having jurisdiction.
7. Closeout Schedule – Complete all required detail.

E. Additional Final Payment Application Requirements: Before final payment application, provide complete Project Closeout requirements as listed under Project Closeout Procedures.

1.6 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When substantiating data is required, Contractor shall submit information as specified in Section 01300, SUBMITTALS, with a cover letter identifying:

1. Project
2. Application number and date
3. Detailed list of enclosures

B. For products stored off-site, provide:

1. Item number and identification as shown on application
2. Description of specific material

3. Insurance certificate and transfer of title
4. Right of Entry

C. Submit one copy of data and cover letter for each copy of application.

1.7 APPLICATION FOR FINAL PAYMENT

A. Fill in application form as specified for progress payments.

B. Use continuation Sheets for presenting the final statement of accounting.

1.8 SUBMITTAL PROCEDURE

A. Submit five (5) copies of Applications for Payment to the Architect at the times stipulated in the Agreement.

B. Submit under transmittal letter as specified in SUBMITTALS Section.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01027

SECTION 01030 - ALTERNATES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

A. Examine the GENERAL CONDITIONS for additional requirements which will affect this Section whether or not specifically mentioned in this Section.

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Identification and description of Alternate Work.

1.3 RELATED SECTIONS

A. Section 00300 – GENERAL BID FORM
B. Section 00310 – SUB-BID FORM
C. Section 00700 – GENERAL CONDITIONS
D. Section 01300 - SUBMITTALS
E. Section 01600 – MATERIALS AND EQUIPMENT
F. Section 01040 – COORDINATION
G. Section 15400 – PLUMBING (FILED SUB-BID)
H. Section 15600 – HVAC (FILED SUB-BID)
I. Section 16000 – ELECTRICAL (FILED SUB-BID)

1.4 COORDINATION

A. Coordinate related work and modify surrounding work as required to complete the work of Alternates. Coordinate the work with that of other trades affecting or affected by the work of Alternates.

B. The work of the various trades to be performed under Alternates shall be in strict accordance with the requirements of the particular trade Section of the Specifications.

1.5 BIDDING INSTRUCTIONS FOR ALTERNATES

A. Each General Bidder and each Sub-Bidder shall thoroughly examine the Contract Documents and fully determine the scope of the Alternates generally defined herein, recognizing any modifications to his / her work required by any Alternate whether or not his / her particular trade Section is mentioned herein.

B. All portions of the Work which are affected by Alternates, but which are not included in Filed Sub-Bid Sections shall be done by the General Contractor.

C. A Filed Sub-Bidder shall enter in the SUB-BID FORM only the amount of the addition or subtraction necessitated by the Alternate which pertains to the work of his / her trade.

D. General Bidders shall enter a single amount in the appropriate space provided in the GENERAL BID FORM which total amount shall consist of the Filed Sub-Bidder's amounts and the amount for all work to be performed by the General Contractor.

E. Prices for Alternates shall include overhead, profit and all other expense items incidental to the Work.

F. Bidders shall bid on all Alternates; the term "NO BID" shall not be used. If the price for an Alternate results in neither an addition nor a deduction to the base bid sum, the words "NO CHANGE" shall be inserted in the appropriate spaces.

G. The Owner shall have the right to accept or reject any or all Alternates prior to signing the Agreement. Alternative will be considered only in the order in which they are listed on the Bid Forms.

1.6 ALTERNATES:

A. Alternate No. 1: "HVAC Grille, Title IX Locker Room"

1. Add to base bid: (PLUMBING FILED SUB-BIDDER) Remove existing through wall HVAC return grille, patch CMU wall, and provide new opening in the CMU wall and new return air grille and associated ductwork to connect to existing air handler.
2. Add to base bid: (GENERAL BIDDER) Provide three "Type 'A'" lockers and stools complete as specified in the space provided by the removal of the existing grille. Paint and prepare wall surface for complete installation of the additional three lockers.

B. Alternate No. 2: "HVAC Air Handler, Cosmetology Lab"

1. Add to base bid: (HVAC FILED SUB-BIDDER) Remove existing unit ventilator completely and prepare opening for new unit ventilator as specified on H1.03.
2. Add to base bid: (GENERAL BIDDER) Modify existing window / wall opening as required for new unit ventilator and patch to match with matching wall material & window mullion stock and / or glazing as required to render a tight seal.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01030

SECTION 01040 – COORDINATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section

B. Examine all other Sections of the Specifications for requirements that affect work of this Section-whether or not such work is specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Coordination of elements of the Work

B. Coordination of Contract Closeout

1.3 RELATED SECTIONS

A. Section 01010 – PROJECT PROCEDURES
B. Section 01200 – PROJECT MEETINGS: Preconstruction conferences & progress meetings.
C. Section 01600 – MATERIAL AND EQUIPMENT: Product options and substitutions.
D. Section 01700 – CONTRACT CLOSEOUT: Closeout submittals.
E. Section 01300 – SUBMITTALS: Submittal procedures.

1.4 COORDINATION REQUIREMENTS

A. The General Contractor shall coordinate with Architect scheduling, submittals, and work of the various sections of the specifications with Sub-contractors to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

B. Coordinate sequence of work to accommodate Owner occupancy as specified in Section 01010, PROJECT PROCEDURES.

C. Refer to GENERAL CONDITIONS for additional coordination requirements.

D. Meetings: In addition to progress meetings specified in Section 01200, hold coordination meetings and pre-installation conferences with personnel and Sub-contractors to assure coordination of work. Architect will be invited to all coordination meetings, and shall be notified a minimum of 24 hours in advance. The Contractor shall keep written meeting minutes and will provide copies to the Architect on a weekly basis.

1.5 COORDINATION OF SUBMITTALS

A. The General Contractor shall schedule and coordinate submittals specified in Section 01300, SUBMITTALS.

B. The General Contractor shall coordinate the work of various Section having interdependent responsibilities.

C. The General Contractor shall coordinate requests for substitutions to assure compatibility of specifications, of operating elements, and effect on space requirements and work of other Sections.

1.6 COORDINATION OF ELEMENTS OF THE WORK

A. Before commencing any work, the General Contractor shall prepare and submit a sequence of operations for all work under this Contract as stipulated in Section 01300, and submittals for approval by Architect.

B. If, in the judgment of the Architect, continued work under the approved sequence of operations may interfere with the progress of the Work, the Architect may direct the General Contractor to accelerate, interrupt, or cease work at particular points. The General Contractor shall make reasonable changes in the sequence of operations to accommodate these directions at no additional cost to the Owner.

C. The General Contractor shall give his personal supervision to the Work or have a competent superintendent on the Work at all times during the progress of the Work to assure the proper coordination and expediting of the Work.

D. The General Contractor shall lay out the Work, and be responsible for all lines, elevations, and measurements of the building and other work executed under the Contract. He shall exercise proper precaution to verify the dimensions shown on the Drawings before laying out the Work and will be held responsible for any error resulting from his failure to exercise such precaution.

E. The General Contractor shall be in charge of the entire Work and shall be responsible for the prompt coordination of all trades, including his own forces and his Sub-contractors, as well as the Owner's separate Contractors if they are on the job during the Contractor's operations, and become fully familiar with all work required under the Contract.

F. The General Contractor's responsibility for the coordination of all work under the Contract shall be complete, and shall extend to all modifications in the Work, whether or not such modifications entail a change in the Contract Price. Where the Contract Documents allow an optional material method of performing a portion of the Work, or where the General Contractor is ultimately allowed or directed to perform a part of the Work using a substitute material or method, the General Contractor shall provide all other coordination and additional work that such change necessitates, without any additional cost to the Owner.

1.7 COORDINATION OF CONTRACT CLOSEOUT

A. The General Contractor shall coordinate the completion of the work of separate Sub-contractors in preparation for Substantial Completion.

B. After Owner occupancy of premises, coordinate access to the site by various Sub-contractors for correction of defective or unfinished work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

C. Assemble and coordinate submittals specified in Section 01700, CONTRACT CLOSEOUT.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01040

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

A. Examine the GENERAL CONDITIONS for additional requirements which will affect this Section whether or not specifically mentioned in this Section.

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUMMARY OF WORK

A. Project Identification: As follows:

1. Project: **WALTHAM HIGH SCHOOL**
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM

2. Owner: **Waltham School Department**
City of Waltham
617 Lexington Street
Waltham, MA 02452

B. Contract Documents, dated May 30, 2012, were prepared by JFF Design, Architects, 24 Warwick Avenue, Waltham, MA 02452, (781) 899-6908.

C. The Work consists of but not limited to the complete rehabilitation of three existing spaces within the existing Waltham High School and work to the extent and as delineated and as described in the Contract Documents. Work associated with the Filed Sub-Bid categories, Mechanical, Electrical and Plumbing, will be performed by those Sub-Bidders.

1. Chef's Kitchen:

a. Limited selective demolition occurs in the Chef's Kitchen including complete removal of existing VCT tile floor and preparation for new sheet linoleum flooring product.
b. Repair and patch of all walls from newly installed utilities and existing pock marks.
c. Installation of new ceiling systems as delineated on the Architectural Construction Documents.
d. Complete layout, procurement of equipment and rough and final connections of all kitchen equipment in accordance with the Construction Documents.
e. Installation of new lighting scheme, fixtures and other electrical / fire alarm and safety equipment in accordance with the Construction Documents.
f. All coring to be the responsibility of the associated Filed Sub-Bidder for whose trade the coring is required. They will equally be responsible for sealing all cores with appropriate fire rating material upon completion of their work.

2. Cosmetology Lab:

a. Limited selective demolition occurs in the Cosmetology Lab including but not limited to new saw-cut trenching removal of concrete and installation of new packing material and concrete to match existing floor level for installation of new soil waste line for new sink units. This work to be performed by the General Contractor. The soil waste line to be performed by the Plumbing Filed Sub-Bidder.
b. The complete removal of existing VCT tile floor and preparation for new sheet linoleum flooring product.
c. Installation of new part-height wall as detailed in the Construction Documents for concealing new piping and wiring associated with new sink units.

d. Complete layout, procurement of equipment and rough and final connections of all cosmetology equipment in accordance with the Construction Documents.
e. Removal of existing 2 x 4 acoustical ceiling tiles, cleaning and painting of the existing grid and the installation of new light fixtures and acoustical ceiling tiles in accordance with the Construction Documents.
f. Painting of all new wall construction in accordance with the Construction Documents.

3. Title IX Locker Room:

a. Extensive selective demolition occurs in the Title IX Locker Room including complete removal of existing shower stalls (to be removed by the General Contractor), associative piping (to be removed by Plumbing Filed Sub-Bidder) and required concrete slabs (to be removed by the General Contractor) and replacement for smooth floor transition and patching (to be performed by the General Contractor).
b. Painting of entire area of work for new wall and floor material in accordance with Construction Documents.
c. Procurement, preparation and installation of new lockers and benches.
d. Manufacturer and installation of metal security grates in accordance with Construction Documents.
e. Procurement and installation of new overhead projection device.
f. Attention to add alternative work as prescribed in the Alternates Section 01030 and in accordance with the Construction Documents.

4. Provide all demolition shown on the plans and as necessary to accomplish all the work of the contract. Please note that all the demolition and patching for the Mechanical, Electrical and Plumbing work shall be performed by the Mechanical, Electrical and Plumbing Filed Sub-Bidder.
5. Patching: The General Bidder shall own ALL patching to existing walls, floors and ceilings that are disturbed by any of the demolition activities outside of the Filed Sub-Bid categories. Patching shall match existing adjacent materials and finish (including texture).
6. Filed Sub-Bid Demolition includes the demolition of any and all existing building materials, finishes, systems and/or equipment that is required to be removed in order to perform the work of the Filed Sub Bid, including disposal unless noted otherwise. Patching shall match existing adjacent materials and finish (including texture).

1.3 WORK RESTRICTIONS

A. Contractor's Use of Premises: During construction, Contractor shall have limited use of building as indicated. Contractor's use of premises is limited to the area of the work and access to the area of work.

B. Work to be performed around the normal school hours, summer school and weekend building use schedules. Work to be performed during school summer hours until August 28, 2012, Monday – Friday 7 AM – 5 PM, are assumed normal hours. Hours worked outside of this time frame are available to all Contactors and Sub-Contractors and additional cost will not be authorized nor considered. Contractor shall maintain a minimum of two paths of egress from all intersecting spaces and corridors. The actual paths of egress shall be coordinated in the field with the Architect and Director of Facilities prior to the commencement of work in any given area. The Contractor will coordinate these areas with the School Administration, Director of Facilities and Architect. If work continues beyond the start of school, August 29, 2012; the Contractor will coordinate working time with the Director of Facilities and Architect outside of normal school hours. Work continuing beyond August 29, 2012, with exception to holiday or school vacation time, will be allowed Monday – Friday from 2:15 PM – 11 PM, with both Saturday and Sunday available. The adjusted "school session" hours are considered normal work time with respect to the project and additional cost will not be authorized nor considered.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01100

SECTION 01200 – PROJECT MEETINGS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section
B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Pre-construction meeting.
B. Administration of progress meetings

1.3 RELATED SECTIONS

A. Section 01040 – COORDINATION: Coordination of elements of the Work.
B. Section 01300 – SUBMITTALS: Progress Schedules; Progress Reports; Schedule of Values.

1.4 MEETINGS

A. The Architect will schedule pre-construction organizational meetings, periodic project meetings, specially called meetings throughout the progress of the Work, and post-construction meetings.
B. All of these meetings shall be attended by the representatives of the Owner, General Contractor and Architect. Consultants and Sub-contractors shall attend only if requested by the Architect.

1.5 PRE-CONSTRUCTION ORGANIZATIONAL MEETINGS

A. Immediately following award of Contract, the Architect will call one or more preliminary organizational meetings during which detailed procedures will be worked out for submission and review of Shop Drawings and samples, format and extent of the construction schedule and schedule of values, format and methods for progress payment requisitions, channels of communication between the Architect and General Contractor's personnel, and other routines to be followed during construction.

1.6 PROJECT MEETINGS

A. The Architect will call together, not less than twice each month and at other reasonable times, representatives of the Owner, General Contractor and Architect, to meet at the site to report on the condition of the work under their charge, or on any other matters pertinent to the conduct of the Work. Sub-contractors shall attend such meetings at the request of the Architect.
B. The Architect will take the minutes of such meetings and distribute copies to the Owner and General Contractor. The General Contractor shall distribute the meeting notes to all Sub-contractors.
C. The Contractor shall be represented by a principal, project manager, general superintendent or other authorized representative, as well as the Contractor's own superintendent. Such representatives shall be empowered to make binding commitments on all matters to be discussed at such meetings including costs, payments, Change Orders, time schedules and manpower. Any notices required under the Contract may be served on such representatives at these meetings.
D. The General Contractor shall furnish the Architect, in writing, the names, addresses, and telephone numbers of General Contractor's and principal Sub-contractor's personnel to be contacted in the event of an after-hours emergency at the site. The General Contractor shall also maintain a similar list readily visible from the outside of the field office.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01200

SECTION 01300 – SUBMITTALS

PART 1 - GENERAL

GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

SECTION INCLUDES

D. Construction Progress Schedule
E. Shop Drawings, Product Data and Samples
F. Schedule of Values
G. Certificates of Compliance

RELATED SECTIONS

H. Section 01010 – PROJECT PROCEDURES
I. Section 01027 – APPLICATIONS FOR PAYMENT
J. Section 01700 – CONTRACT CLOSEOUT
K. Section 00500 – AGREEMENT
L. Section 01600 – MATERIALS AND EQUIPMENT

CONSTRUCTION PROGRESS SCHEDULE

M. Within five (5) days after execution of the Contract, the Contractor shall submit to the Director of Facilities through the Architect, a draft of the Baseline Project Schedule. This Baseline Schedule shall be in the form of a Horizontal Bar Chart designed to indicate the rate of progress and the necessary dates of all significant events which will insure Substantial Completion of the Work within the time specified.

N. The Baseline Project Schedule shall be presented in a form acceptable to the Architect and subject to his approval. The Schedule shall be brought up to date no less often than once each month by the same personnel or firm that prepared the original. Receipt of the updated Schedule shall be a condition prerequisite to the Architect's approval of application for monthly payment.

O. Distribution: Provide three (3) copies of each schedule to the Architect. Provide additional copies on a need-to-know basis to Sub-contractors and others. At least one (1) copy shall be available in the field office. Each update shall be similarly distributed.

P. All work in establishing and maintain the Baseline Project Schedule shall be paid for by the Contractor and shall be included in the Contract Sum.

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

Q. Submit Shop Drawings, product data and samples for all items as required by the specifications and as directed by Architect. See GENERAL CONDITIONS for additional requirements.

R. Schedule: The General Contractor, within five (5) days after signing the Contract, shall prepare and submit for the Architect's approval a schedule of Shop Drawings, product data and samples required to be submitted for the Work. The schedule shall indicate by trade the date by which final approval of each item must be obtained for each phase, and shall be revised as required by conditions of the Work, subject to Architect's approval. The schedule shall allow a minimum of twenty-one (21) days after Architect's receipt of documents for the Architect's review of each submission or re-submission, including consultant's review, plus an allowance for receipt of

submittals by the Architect and subsequent distribution by the General Contractor. The General Contractor is required to adhere strictly to the established schedule dates.

S. Notes or other information on the Shop Drawings, labels, transmittals or other items submitted which are contrary to provisions of the Contract Documents shall be deemed to be addressed to the General Contractor, applicable Sub-contractor, material men or other parties involved, and shall have no force or effect with respect to this Contract, even though the Shop Drawing or sample involved is approved by the Architect. In particular the terms "By Others," "NIC," or words of similar meaning and import on submissions shall not be deemed to imply that the referenced items are to be omitted from this Contract.

T. Substitutions: Refer to Section 01600, MATERIAL AND EQUIPMENT, for additional requirements pertaining to substitutions. All proposed substitutions shall be accompanied by the attached "Substitution Request Form" on which the Contractor shall state that:
   1. The proposed substitution does not affect dimensions indicated on Drawings.
   2. The Contractor making the requires for the substitution shall pay the costs of changes to the building design, including engineering design, detailing and all additional construction costs, and submittal review costs caused by the requested substitution.
   3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
   4. Maintenance and service parts are locally available for the proposed substitution.
   5. The function, appearance and the quality of the proposed substitution are equal or superior to the specified item.
   6. Once the substitution is accepted by the Architect, a formal submittal must be forwarded as outlined in paragraph 1.06.

U. Certificate of Compliance: The General Contractor shall submit certificates of compliance along with the associated Shop Drawings, product data and samples required for each product. Submit one copy of each certificate on 8 ½" x 11" white paper. The Architect will retain the certificate of compliance; no approval reply is intended.

SHOP DRAWINGS AND PRODUCT DATA

V. To receive consideration by the Architect, Shop Drawings and product data shall be accompanied by a letter of transmittal and each shall contain the following information:
   1. Product identification
   2. Architect's name
   3. Date of preparation of submission, and of revision if applicable
   4. Shop Drawing number and title of item the drawing refers to
   5. Architect's drawing numbers and specifications paragraph number used as a reference in preparing shop drawings
   6. Contractor's and Sub-contractor's name
   7. Names of person or firm preparing drawings
   8. Statement or stamp of approval by the General Contractor, which shall signify that he has seen and examined the drawing and that requirements of the General Conditions have been complied with.

W. Shop Drawings and product data relating to various units comprising a proposed assembly shall be submitted simultaneously so that said units may be checked individually and as an assembly.

X. Shop Drawings and product data shall be submitted to the Architect through the General Contractor. Drawings or product data submitted directly from Sub-contractors, manufacturers or vendors, or directly to the Architect's consultants, will be returned to the Contractor without action unless prior approval is rendered by the Architect in an effort to streamline the approval process. In such case, Shop Drawings submitted in this manner will include a separate copy submitted to the Architect for his concurrent review.

PRODUCT DATA

Y. Submit five (5) copies each of standard manufactured items in the form of manufacturer's product data (catalog sheets), showing illustrated cuts of the items to be furnished, scale details, sizes, dimensions, performance characteristics, capacities, and other pertinent information, accompanied by an appropriate transmittal form with specific reference to the applicable paragraph in the Specifications. Such sheets will be marked either "Accepted" or "Rejected", and two copies of each will be returned to the General Contractor. Rejected submittals shall be resubmitted in the same manner until acceptance is obtained.

Z. Indicate clearly on such printed matter which of several items is being submitted for approval.

AA. If catalog cuts of standard manufactured items show different types, options, finishes, performance requirements, and other variations, those features that the Contractor proposes to furnish shall be clearly circled or otherwise indicated, and all irrelevant diagrams, notes, or other information deleted or canceled. If any variations from the catalog description are proposed or required, such variations shall be clearly noted on the cut by the Contractor. Catalog cuts of wiring diagrams will not be acceptable.

BB. Patterns and Colors: The General Contractor shall submit accurate color charts and pattern charts to the Architect for his review and selection whenever a choice of color or pattern of a product is indicated in the Contract Documents.

SHOP DRAWINGS

CC. Each Drawing and print shall have a clear space approximately 8 square inches as an additional border on the right side or bottom of the transparency for stamps and Architect's comments.

DD. The Architect will annotate the transparency and indicate one of the following marks as applicable
REJECTED
REVISE – RESUBMIT
ACCEPTED AS NOTED
ACCEPTED

EE. For Drawings marked "Rejected," or Revise – Resubmit," the Architect will keep one print. Such prints shall be used for record purposes and for comparison with subsequent re-submissions. One print will be retained by the Architect, one print will be issued to the Director of Facilities and the transparency and any remaining prints will be returned to the General Contractor.

FF. Drawings marked "Accepted as Noted," shall be treated as approved Drawings. The Architect's comments shall be considered part of the original Drawings. Should the Contractor disagree with such comments, he shall so notify the Architect in writing within fourteen (14) days after receipt of such Drawings and before commencing work on the items in question. Failing this, the Contractor shall be deemed to have accepted full responsibility for implementing such comments at no additional cost to the Owner.

GG. For Drawings marked "Accepted" or "Accepted as Noted," the Architect will keep one print, one print will be furnished to the Director of Facilities and one print will be furnished to the applicable consultants, if any. The transparency and any remaining prints will be returned to the General Contractor.

HH. Shop Drawings shall clearly indicate all details, sectional view, arrangement, working and erection dimensions, kinds and quality of materials and their finishes, and other information necessary for proper checking and for fabrication and installation of the items, and shall include all information required for making connections to other work.

II. If any information on previously submitted Shop Drawings, aside from notations make by the Architect, is revised in any way, such revision shall be circled or otherwise graphically brought to the Architect's attention. If approved Drawings are subsequently revised, they shall be resubmitted to the Architect with all revisions clearly marked for the Architect's attention. When-

ever Drawings are revised, the latest revision shall be circled or otherwise indicated to distinguish it clearly form all previous revisions (and from the information on the original Drawing).

JJ. Should the Architect, in checking Shop Drawings, make changes which the Contractor deems will increase the Contract Price, the General Contractor shall so inform the Architect in writing within fourteen (14) days following receipt of the checked shop drawings and prior to starting fabrication of the item or items. Failing this, the Contractor shall be deemed to have waived all claims for extra compensation for the work involved.

KK. The General Contractor shall be responsible for obtaining and distributing copies fo approved Shop Drawings to his Sub-contractors and material suppliers needing such information, at no additional cost to the Owner.

LL. The General Contractor shall keep on the site, in good order, a complete up-to-date set of all approved Shop Drawings.

SAMPLES

MM. Before submitting samples, consult with Architect to verify that samples will be required and to determine whether samples are to be submitted to Architect's office, field or other location.

NN. Samples shall be submitted in triplicate, unless otherwise specified or directed by the Architect.

OO. Samples may be submitted to Architect directly from manufacturers, vendors, suppliers, Sub-contractors, or others, but a separate transmittal letter shall be submitted through the General Contractor in each such case.

PP. Approved samples of major or expensive items or assemblies, if in good condition and meeting all requirements of the Contract, may be properly marked for identification and used in the Work, provided that all shipping and handling charges are paid by the Contractor.

QQ. Each sample shall have a label indicating the material represented, its place of origin, and the names of the producer, the Architect, the General Contractor, the Sub-contractor and the building or Work for which the material is intended. Samples shall be marked to indicate the Drawing numbers or specification paragraph requiring the material represented.

RR. Approval of samples for color, texture and other aesthetic qualities shall not be construed as approval of other characteristics.

SS. Field Samples: Provide field samples of finishes at site as required by individual specification Sections. Install sample compete and finished. Acceptable samples in place may be retained in completed Work.

SCHEDULE OF VALUES

TT. Information Required:
1. Submit Schedule of Values in accordance with the requirements of the General Conditions and as further specified herein.
2. The value of each line item shall represent the value of work associated with such item.
3. In preparing the Schedule, each sub-division of classification of the Work shall be identified by code number referring to each individual Section (or Sub-Section where applicable) of the Specifications.
4. Attached to the Schedule of Values shall be a list of the names, addresses (and whether individual, partnership or corporation) of each Sub-contractor or Sub-Subcontractor who is to perform all or any part of each sub-division. In the event any Sub-contractors, of Sub-Subcontractors, are not known at the time said schedule is prepared, an amended or supplementary list containing the names of the Sub-contractors and Sub-Subcontractors involved and indicating their division of the Work shall be furnished to the Architect as soon as the information is available. A code number for identification on requisitions shall be used to identify the Contractor, each of the Sub-contractors and subordinate Sub-contractors, and shall be shown in each requisition where any part of the Work performed

by the Contractor, such Sub-contractor, Sub-Subcontractors or material suppliers is incorporated in the amount of the requisition for which payment is requested.

5. The Schedule of Values shall be arranged in vertical columns identified with titles, including Names of Items, Original Amounts, Percent Completed to Date; Previous Payments; Current Requests; Balance Not yet Requested and Retained Amounts. A summary of the total amount due to date and the amount of the five percent retained shall be included in the statement which shall be signed by the General Contractor. A separate sheet shall be included with each requisition showing status of work covered by approved Change Orders. The schedule shall be revised if later found by the Architect to be inaccurate.
6. Submit to the Director of Facilities such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Director of Facilities may request concerning Work performed or to be performed un this Contract.

UU. Schedule Requirements: The General Contractor shall:
1. Submit to the Architect two copies of the Schedule of Values within 5 days of receipt of Notice to Proceed.
2. Upon request by the Architect, support values given with data that will substantiate their correctness.
3. Submit quantities of designated materials for materials stored on which payment is expected to be made.
4. Use Schedule of Values only as basis for Contractor's Application for Payment.

VV. Form of Submittal:
1. Submit typewritten Schedule of Values on 8 ½" x 11" white paper.
2. Use Table of Contents of the Project Manual as basis for format for listing costs of work and identify each line with number and title of Section.

WW. Preparing Schedules of Values:
1. Itemize separate line item cost for each of the following general cost items:
   a. Performance and Payment Bonds.
   b. Field supervision and layout.
   c. Construction facilities and temporary controls.
   d. Temporary Improvements and Continuity of Services
2. Itemize separate line item cost for work required by each Section of the Specifications. Sections shall be further subdivided into separate line items under each section as required by the Architect.
3. Break down installed costs into:
   a. Delivered cost of product.
   b. Total installed cost, with overhead and profit.
   c. Note: The Owner is tax exempt for all materials incorporated into the construction.
4. For each line item which has installed value of more than $10,000.00, break down costs to list major products or operations under each item.
5. Make sum of total costs of all items listed in schedule equal to total Contract Sum.

XX. Review and Re-submittal: After review by Architect, revise and re-submit schedules as required. Re-submit revised schedules in the same manner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01300

SECTION 01400 – QUALITY CONTROL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Administrative and procedural requirements for quality control services.
B. Assignment of responsibilities.
C. Required submittals

1.3 RELATED SECTIONS

A. Section 01300 - SUBMITTALS
B. Section 01600 – MATERIALS AND EQUIPMENT
C. Section 01040 - COORDINATION

1.4 SCOPE OF SERVICES

A. Quality control services include inspections, tests and related actions, including reports, performed by independent agencies, governing authorities, and the General Contractor. They do not include Contract enforcement activities performed by the Architect.

B. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the General Contractor of responsibility for compliance with Contract Document requirements.

C. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

D. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard product as well as customized fabrication and installation procedures.

E. Inspections, tests and related actions specified are not intended to limit the General Contractor's quality control procedures that facilitate compliance with Contract Document requirements.

F. Requirements for General Contractor to provide quality control services required by the Architect, Owner or authorities having jurisdiction shall not be limited by provisions of this Section.

1.5 GENERAL CONTRACTOR'S RESPONSIBILITIES

A. The General Contractor shall provide inspections, tests and similar quality control services specified in individual specification Sections and those required by governing authorities, except where they are specifically indicated to be the work of another identified entity and not by the General Contractor.

B. Costs for such quality control services shall be included in the Contract Sum.

C. The General Contractor shall employ and pay an independent agency to perform specified quality control services.

D. The Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's Quality Control Services. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work and the

General Contractor is also required to engage an entity for the same or related element, the General Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

E. Re-testing: The General Contractor is responsible for re-testing where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the General Contractor's responsibility.

F. Cost of re-testing construction revised or replaced by the General Contractor is the General Contractor's responsibility where required tests were performed on original construction.

G. Testing required by the Owner to analyze or to confirm the quality or conformance of materials, assemblies or sub-assemblies to the specifications are the responsibility of the Owner and will be paid for by the Owner so long as it is found the materials, assemblies, or sub-assemblies meet or exceed the requirements of the specification. If any of these are found to be deficient, the General Contractor will be responsible for the costs of testing and re-testing as well as repairing and/or replacing the Work found to be deficient.

1.6 ASSOCIATED SERVICES

A. The General Contractor shall cooperate with all agencies performing required inspections, tests and similar services and shall provide reasonable auxiliary services as required.

B. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required of the Contractor include but are not limited to:
1. Providing access to the work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
3. Providing facilities for storage and curing of test samples and delivery of samples to testing laboratories.
4. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
5. Security and protection of samples and test equipment at the project site.

1.7 OWNER'S QUALITY CONTROL SERVICES

A. The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies, except where such service are specifically indicated as the General Contractor's responsibility, or are provided by another identified entity.

B. Costs for these services are not included in the Contract Sum.

C. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.

D. Copies of reports of Owner's testing agency will be provided to the Contractor as required.

E. Quality control services provided by the Owner are for the benefit of the Owner and shall not relieve the Contractor from compliance with the requirements of the work to be performed as a part of this Contract.

1.8 DUTIES OF THE TESTING AGENCY

A. The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual specification Sections shall cooperate with the Architect, Owner and General Contractor in performance of its' duties, and shall provide qualified personnel to perform required inspections and tests.

B. The agency shall notify the Architect and General Contractor promptly of irregularities or deficiencies observed in the Work during performance of its' services.

C. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.

D. The agency shall not perform any duties of the General Contractor.

E. The General Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.9 SUBMITTALS

A. The Contractor's independent testing agency shall submit a certified written report of each inspection, test or similar service to the Architect through the General Contractor in duplicate. Submit additional copies of each written report directly to the governing authority, when the Architect so directs.

B. Report Data: Written reports of each inspection, test or similar service shall include, but not limited to:
1. Date of issue
2. Project title and number
3. Name, address and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Designation of the work and test method.
7. Identification of product and specifications section.
8. Complete inspection or test data.
9. Test results and an interpretation of test results.
10. Ambient conditions at the time of sample-taking and testing.
11. Comments or professional opinion as to whether inspected or tested work complies with Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on re-testing.

1.10 QUALIFICATIONS FOR CONTRACTOR'S SERVICE AGENCIES

A. Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and test to be performed.

B. Each independent inspection and testing agency engaged on the project shall be authorized by authorities having jurisdiction to operate in the Commonwealth of Massachusetts.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample-taking and similar services for quality control, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.

B. Protect construction exposed by or for quality control service activities and protect repaired construction.

C. Repair and protection is the General Contractor's responsibility, regardless of the assignment of the responsibility for inspection, testing or similar services.

END OF SECTION 01400

SECTION 01500 – CONSTRUCTION FACILITIES AND TEMPORY CONTROLS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Temporary facilities and services.
B. Temporary enclosures
C. Hoisting equipment and machinery.
D. Staging and scaffolding.
E. Temporary use of elevators.
F. Maintenance of access
G. Protection of work, property and the public
H. Cleaning during construction.
I. Removal

1.3 RELATED SECTIONS

A. Section 01010 – PROJECT PROCEDURES
B. Section 01700 – CONTRACT CLOSEOUT: Final cleaning.
C. Section 01040 – COORDINATION
D. Section 01100 – SUMMARY

1.4 TEMPORARY FACILITIES AND SERVICES

A. General Contractor shall be responsible for arranging and providing temporary facilities and general services as specified herein and as otherwise required for proper and expeditious prosecution of work. Except as otherwise specified, the General Contractor shall pay costs for all temporary facilities and general services until Date of Substantial Completion of the Work established by the Architect and shall remove same at completion of the Work.

B. All such services and facilities shall comply with applicable Federal, State and Local regulations.

C. General Contractor shall make all connections to existing services and sources of supply, shall provide all necessary installations, labor, materials and equipment in a manner subject to the approval of the Architect and the Owner, and shall remove temporary installations and conditions when no longer required, and shall restore the services and sources of supply to proper operating condition as approved by the Architect.

D. Discontinuance of any temporary service prior to the completion of any portions of the Work shall not render the Owner liable for any additional cost resulting therefrom.

E. Should a change in location of any temporary equipment be necessary in order for the Work to progress properly, General Contractor shall remove and relocate such equipment as required without additional cost to the Owner.

1.5 TEMPORARY ENCLOSURES

A. The General Contractor shall provide temporary enclosure of interior walls for successive areas of the building as the Work progresses, to provide acceptable working conditions, to provide protection for interior materials, to allow for effective dust control and to prevent entry of unauthorized persons.

B. Relocate temporary enclosures as required by the progress of construction or work requirements, and to accommodate legitimate requirement of Owner and Sub-contractors

C. Completely remove temporary materials, equipment and services when construction needs can be met by use of permanent construction without probable damage or at Substantial Completion of the Project.

D. The General Contractor will provide a temporary project screening and access throughout the duration of the project allowing for full privacy within the Title IX Locker Room area. The area will be completely sealed allowing for after-school locker room access to remain but completely isolated and closed off from the work area as determined by the Owner and Architect. The General Contractor will make necessary provisions within this barricade to maintain egress to and from the space by way of a lockable door, keyed into the school security system that allows panic type egress from the locker room side of the barrier.

1.6 HOISTING

A. Unless otherwise specified as the work of a particular Section, all hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the Work shall be furnished, installed, operated and maintained in safe condition by the General Contractor for the use of all Sub-contractors.

B. Sub-contractor's material and/or equipment delivered to the designated hoisting area shall be hoisted by the General Contractor's equipment , except that which is specifically required to be hoisted by the Sub-contractor themselves and is so stated in the applicable Section of the specifications.

C. All costs for hoisting operating services shall be borne by the General Contractor unless specifically indicated otherwise in the Contract Documents.

D. Permit no materials to be passed through the finished openings of exterior wall. Be responsible and bear all costs for repair and/or replacement of all damaged worked caused thereby.

1.7 TEMPORARY USE OF ELEVATORS

A. The building elevator shall not be used for hoisting or transporting building material by any trade.

1.8 MAINTENANCE OF ACCESS

A. The General Contractor shall maintain a safe and convenient means of egress to all useable areas of existing building for the Owner for the duration of the Contract. The General Contractor shall provide and maintain for the duration of the Contract, a means of access to, around and within the site, as shown on the Contract Drawings, for vehicular traffic and authorized personnel. This means of access shall be constructed to sustain the weight of equipment customarily engaged for use in the construction projects of this type and magnitude.

B. The General Contractor shall, without additional compensation from the Owner, furnish labor and materials as may be required from time to time to maintain this means of access in an acceptable condition as determined by the Architect.

1.9 PROTECTION OF WORK, PROPERTY AND THE PUBLIC

A. The General Contractor shall construct barricades and protective facilities required for the protection of the public in accordance with local and State regulations. Furnish and install all signs, lights, reflectors and all such protection facilities as may be required.

B. The General Contractor shall hold the Owner harmless from all claims arising from the use of public streets, sidewalks, and adjoining premises for construction purposes.

C. The General Contractor shall keep all access roads and walks clear of debris, materials, construction plant and equipment during construction operations. Repair streets, drives, curbs, sidewalks, fences, poles and the like where disturbed during construction and leave them in as good condition after completion of the Work as before operations started.

1. Provide ways and means to control the flow of water from every source which may cause delay or damage during construction operations.
2. Protect all planting, landscaping, trees and site improvements in the areas of site work and construction work.

D. The General Contractor shall be responsible for the maintenance of construction barriers and traffic barriers in order to maintain traffic, over, through or around the Work with the maximum amount of safety and practical convenience to such traffic during the life of the Contract, and whether or not work has been suspended temporarily. The General Contractor shall take all precautions for preventing injuries to persons or damage to property to or about the Work.
1. Work shall be carried on the barriers erected in such a manner as to provide safe passage at all times for public travel and with least obstruction to traffic. The General Contractor shall provide and maintain at his own expense in a safe and passable condition such temporary bypasses as created by the barriers as may be necessary to accommodate both pedestrian and vehicular traffic.
2. Maintain all legally required means of egress, and do not erect barriers which interfere with, or obstruct such means of egress.
3. Where new construction, alteration, or repair work coincides with the present traveled way, the General Contractor shall carry on his work so that travel will not be obstructed.

E. Take all required measures to protect the Work at all times against fire, storm, theft, vandalism and other losses.

F. The General Contractor shall be wholly responsible for patrolling and protecting the Work under construction and the materials stored on the site; and shall reimburse the Owner for any losses, damages or injury not compensated by insurance, except those directly caused by the Owner, his agents or his employees.

G. Breakage of Glass: General Contractor shall be responsible for correcting all breakage of glass under this Contract from any cause whatsoever, until the Work is accepted by the Owner. All broken glass shall be promptly and properly replaced with identical materials. Unless the glass has been broken by the Owner or his representatives, or by other separate prime Contractors, the cost for replacement of glass shall be borne by General Contractor.

1.10 DUST CONTROL

A. The General Contractor shall maintain the construction site, stockpiles, access, detour and haul roads, staging and parking area for the Work free of dust which would cause a hazard or a nuisance t those at the site or adjacent sites.

B. Provide positive methods and apply dust control materials to minimize raising dust from demolition and other construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere.

C. Trucks hauling debris shall be covered and we down as required. Spillage on city streets shall be cleaned up immediately.

1.11 CLEANING DURING CONSTRUCTION

A. General Requirements:
1. Execute cleaning during progress of the Work, as required by General Conditions and as herein specified.
2. Maintain premises and public properties free from accumulations of waste, debris and rubbish caused by operations. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces. Leave project clean and ready for occupancy.
3. Prohibit overloading of trucks to prevent spillage on access and haul routes.
4. Refer to Sections of the Specifications for cleaning of specific products or work.

B. Safety and Disposal Requirements:
1. Standards: Maintain project in accordance with State Building Code and local ordinances.

2. Hazards Control:
   a. Store volatile wastes in covered metal containers, and remove from premises.
   b. Prevent accumulation of wastes which create hazardous conditions.
   c. Provide adequate ventilation during use of volatile or noxious substances.
3. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   a. Do not burn or bury rubbish and waste materials on project site.
   b. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
   c. Do not dispose of wastes into streams or waterways.

C. During construction the General Contractor shall:
1. Execute cleaning to ensure that the building, the site, and adjacent properties are maintained free from accumulations of waste materials and rubbish and windblown debris resulting from construction operations.
2. Provide on-site containers for collection of waste materials, debris and rubbish.
3. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas. Provide documentation that waste materials, debris and rubbish was legally disposed of.
4. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
5. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet newly painted surfaces.

1.12 REMOVAL

A. The General Contractor shall remove temporary materials, equipment, services, and construction to Substantial Completion of the Work.

B. The General Contractor shall clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to specified or to original condition.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01500

SECTION 01700 – RECORD DOCUMENTS AND CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Final cleaning. Closeout procedures
B. Maintenance manuals and instructions.
C. Warranties and bonds
D. Closeout requirements

1.3 RELATED SECTIONS

A. Section 01010 – PROJECT PROCEDURES
B. Section 01300 – SUBMITTALS
C. Section 05000 – TEMPORARY FACILITIES: Cleaning during construction.
D. Section 01600 – MATERIAL AND EQUIPMENT

1.4 MAINTENANCE OF OWNER'S RECORD DOCUMENTS AND SAMPLES

A. Maintain Record Documents in a clean, dry and legible condition. Do not use Record Documents for construction purposes.

B. Keep Record Documents an samples available for inspection by Architect.

1.5 CLOSEOUT PROCEDURES

A. Comply with procedures stated in the GENERAL CONDITIONS for issuance of Certificate of Substantial Completion.

B. When Contractor considers the Work has reached Final Completion, submit written certification that Contract Documents have been reviewed, all work has been inspected, and that the Work is complete in accordance with Contract Documents and ready for Architect's inspection.

C. In addition to submittals required by the General Conditions, provide submittals required by governing authorities, and submit a final statement of accounting giving total adjusted Contract Sum, previous payment, and sum remaining due.

D. Architect will issue a final Change Order reflecting approved adjustments to the Contract Sum not previously made by Change Order.

1.6 FINAL CLEANING

A. Execute final cleaning prior to final inspection or Owner occupancy, whichever is first.

B. Clean interior and exterior surfaces exposed to view. Remove temporary labels, stains and foreign substances. Polish transparent and glossy surfaces. Vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean drainage systems.

C. Glass and aluminum work shall be cleaned and washed by professional window cleaner. Polish all glass, mirrors and shiny surfaces.

D. Clean site. Sweep paved surfaces. Rake clean other surfaces.

E. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

F. Owner will assume responsibility for cleaning as of time designated on Certificate of Substantial Completion or Owner's acceptance of Project or portion thereof.

G. Immediately before Owner occupancy, thoroughly clean, wash and polish all floors per manufacturer's recommendations, all existing VCT adjacent to work area shall be waxed. The Owner will supply the wax to the contractor for installation by the contractor.

1.7 MAINTENANCE MANUALS AND INSTRUCTIONS

A. Shop Drawings will not be acceptable as project Record Drawings.

B. All Record Drawing work shall be performed by competent draftspersons. The Architect shall be the sole judge of the acceptability of project Record Drawings.

1.8 WARRANTIES AND BONDS

A. Compile specified warranties and bonds, review to verify compliance with Contract Documents, and submit to Architect for his review and transmittal to the Owner

B. Submittal Requirements:
   1. Assemble two original signed copies of warranties, bonds and service and maintenance contracts, executed by officers of each of the respective manufacturers, suppliers and Sub-contractors.
   2. Table of Contents: Shall be neatly typed in orderly sequence.
   3. Provide complete information for each item. Include:
      a. Product or work item.
      b. Firm, with name of principal, address and telephone number.
      c. Scope
      d. Date of beginning of warranty, bond or service and maintenance contract. These shall commence upon date of Substantial Completion as established by the Architect.
      e. Duration of warranty, bond or service maintenance contract.
      f. Contractor, name of responsible principal, address and telephone number.
   4. Provide information for Owner's personnel.
      a. Proper procedure in case of failure.
      b. Instances which might affect validity of warranty or bond.

C. Form of Submittals: Prepare in duplicate packets and in the following format:
   1. Size 8 ½" x 11". Punched sheets for 3-ring binder. Fold larger sheets to fit into binders.
   2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS." List Title of Project and Name of Contractor.
   3. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

D. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction, submit documents within ten (10) days after inspection and acceptance. Otherwise, make submittals within ten (10) days after Date of Substantial Completion, prior to final request for payment.
   2. For items of work where acceptance is delayed materially beyond the Date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing the date of acceptance as the start of the warranty period.

E. Submittal Required: Submit warranties, bonds, service and maintenance contracts as specified in the respective Sections of the Specifications.

1.9 CLOSEOUT REQUIREMENTS

A. Punch List: When the Architect inspect the Work for Substantial Completion, he will prepare and issue to the General Contractor a "punch list" of items to be corrected before final payment will be made. Such punch list shall not be construed as all-inclusive of the work which the General Contractor will be required to perform before final payment.

B. Substantial Completion: Architect will prepare and issue a Certificate of Substantial Completion, AIA G704, compete with signatures of Owner and the General Contractor, accompanied by list of items to be completed or corrected, as verified and amended by the Architect.

C. Final Inspection:
   1. The General Contractor shall submit written certification that:
      a. Contract Documents have been reviewed.
      b. Project has been inspected for compliance with Contract Documents.
      c. Work has been completed in accordance with Contract Documents.
      d. Equipment and systems have been tested in presence of Owner's Representative and are operational.
      e. Project is completed, and ready for final inspection.
   2. Architect will begin final inspection within seven (7) days after receipt of certification.
   3. Should the Architect consider the work is finally complete in accordance with requirements of Contract Documents, he will request the General Contractor to make Project Closeout submittals.
   4. Should the Architect consider that work is not finally complete:
      a. He will notify General Contractor, in writing, stating reasons.
      b. General Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to the Architect certifying the work is complete.
      c. Architect will re-inspect the work.

D. Closeout Submittals: All required closeout submittals will be reviewed by the Architect and returned to the Contractor for delivery to the Owner. Make arrangements to deliver and install documents at the Owner's designated area.
   1. Project Record Documents.
   2. Operating and Maintenance Data.
   3. Extended Guarantees and Warranties.
   4. Spare Parts and Maintenance Materials.
   5. Evidence of compliance with requirements of governing authorities:
      a. Certificates of compliance for flame and smoke, and fire rating.
      b. Certificates of Occupancy.
   6. Certificate of Insurance for Products and Completed Operations.
   7. Asbestos-free construction guarantee.

E. Instructions: Instruct Owner's personnel in the operation of all systems.

F. Evidence of Payments and Release of Liens:
   1. Contractor's Affidavit of Payment of Debts and Claims, AIA G706, with Consent of Surety to Final Payment: AIA G707.
   2. Certifications (as described in Paragraph 9.3.4 Section 00800) from each filed Subcontractor that payment has been received on the basis of the previous periodic payment to the Contractor.
   3. All submittals shall be duly executed before delivery to the Architect.

G. Final Application and Certificate for Payment:
   1. The General Contractor shall submit final application in accordance with the requirements of General and Supplementary Conditions.
   2. Architect will issue final certificate in accordance with provisions of Conditions of the Contract.
   3. Prior to issuance of the Certificate for Final Payment by the Architect, all requirements contained in this Paragraph entitled "Closeout Requirements" and other requirements of the Conditions of the Contract shall be executed, received and approved by the Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01700

SECTION 02070 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Examine the GENERAL CONDITIONS for additional requirements which will affect this Section whether or not specifically mentioned in this Section.

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 RELATED SECTIONS

A. Section 01010 – PROJECT PROCEDURES
B. Section 01700 – CONTRACT CLOSEOUT: Final cleaning.
C. Section 01040 – COORDINATION
D. Section 15400 – PLUMBING (FILED SUB-BID)
E. Section 15600 – HVAC (FILED SUB-BID)
F. Section 16000 – ELECTRICAL (FILED SUB-BID)

1.3 SUMMARY OF WORK

A. Provide all labor, materials, equipment, services and transportation required to complete selective demolition and removal of existing work, as indicated on Drawings and as specified herein, or both.

B. Perform properly all selective demolition and removal work at the existing building as required to prepare for new construction to be provided under this Contract.

C. Salvage and store items indicated for reuse. See Drawings for locations.

D. All replacement, corrective work performed after selective demolition and subsequent trade work is completed, is to be performed by trained professionals whose trade it is to perform such tasks including by not limited to masonry repairs are to be made by trained professional masons, drywall repairs by professional drywall installers, etc.

1.4 EXISTING CONDITIONS

A. Examine Drawings indicating selective demolition and removal requirements and provisions for new work. Verify all existing conditions and dimensions before commencing work.

B. The Drawings and this Section set forth the general extent of selective demolition and removal work only. The Contractor and Sub-Bidder shall visit the site and examine the existing conditions and shall become familiar with the character, extent and type of demolition and removal work to be performed hereunder.

C. Submit any questions regarding the extent and character of demolition and removal work in the manner and within the time period established for receipt of such questions during the bidding period.

1.5 SPECIAL REQUIREMENTS

A. Maintain adequate passage to and from all exits at all times. Before any work is done which will significantly alter access or egress patterns, consult with Owner and obtain its' approval. Under no circumstances block or interfere with the free flow of people at legally required exits, or in any way alter the required conditions of such exits.

B. Bear complete responsibility for any damage to the building interior or exterior due to improper temporary coverings, and bear all costs for correcting such damage to the satisfaction of the Owner and Architect.

1.6 SCHEDULE

A. Prior to commencing any work under this Section, prepare a complete schedule of demolition, salvage and removals to be performed, indicating the sequence of work in each area and the commencement dates for each activity and submit such schedule to the Architect for review.

B. Modify and update the schedule on a weekly basis and submit the updated schedule to the Architect.

C. No work shall be started in existing building without prior approval of the Owner. The Contractor shall give the Owner adequate advance notice of readiness to start such work in accordance with the approved schedule in order that the Owner may properly arrange its' activities or evacuate the spaces to be affected.

D. No physical work shall be performed outside of the schedule as prescribed in Section 01100 SUMMARY and the General Contractor will provide temporary signage at the door leading to each work zone warning of work being performed. Coordinate with school building officials and Architect.

1.7 PERMITS AND CODES

A. Work shall conform to Drawings and Specifications and shall comply with applicable codes and regulations.

B. Comply with all rules, regulations, laws and ordinances of the City of Waltham, the Commonwealth of Massachusetts and all other authorities having jurisdiction.

C. Procure and pay for all permits and licenses required for work specified herein.

1.8 PUBLIC AND PROPERTY PROTECTION

A. Provide all measures required by federal, municipal and stat ordinances, law and regulations for the protection of surrounding property, sidewalks, curbs, the public, workers, students and Owner's employees during demolition operations. Measures taken, including sidewalk shed as required, barricades, fences, warning lights and signs, rubbish chutes, etc., shall be in strict accordance also with the American National Standard Code for Building Construction ANSI A10.6 as well as all applicable federal, local and state ordinances and laws.

B. Demolition shall be carried on in a manner that will insure the safety of adjacent property, property which is occupied and persons occupying such property against all damage and injuries which might occur from falling debris or other cause, and so not to interfere with the use of adjacent buildings and structures or the free and safe passage to and from the same.

C. Protect all walks, roads, streets, curbs, pavements, trees and plantings, on or off the premises, and repair and replace or otherwise make good all damage as directed by the Architect.

D. Contractor will coordinate location of dumpsters with Architect and Owner and provide minimum ¾" plywood beneath rollers of roll-off dumpsters.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REQUIREMENTS AND CONDITIONS

A. Precautions: Removal of portions of existing cabinetry as required shall be done with care using tools and methods. Care shall be taken in all removal operations.

B. Do no burning of trash or debris on site.

3.2 DEMOLITION WORK

A. Demolish and remove completely in accordance with approved schedule portions of the existing structure and salvage items indicated.

B. Control: Take all reasonable precautions to limit the amount of dust and dirt rising in the air, and noise produced.
   1. Spray down dust-producing materials before and during placing in trucks or in open storage containers.
   2. Use only trucks equipped with approved tarpaulins for transporting of dust-producing materials and materials that could be dislodged by wind.
   3. Minimize noise-producing activities and perform them during normal working hours unless otherwise approved by the Architect.

C. Items for Reuse: Verify which existing items are to be removed and salvaged under this Contract. Use special care in removing, handling, and storing such items in order to minimize additional work required to be performed thereon, and to prevent damage. Transport, unload, and store existing items to be re-used, as specified herein or as directed.

D. Cutting: Perform all cutting of existing surfaces in a manner which will ensure a minimal difference between the cut area and new material when patched. Use extreme care in cutting existing surfaces containing concealed piping which is to remain and bear full responsibility for repairing or replacement of all such work which is accidently damaged.

E. Except where special surface preparation is specified under other Sections, leave existing surfaces which are to remain in a condition suitable to receive new materials and finishes.

F. Rubbish: Remove all rubbish and debris resulting from demolition work daily, legally disposing of same at an off-site location. Routes of equipment handling demolition debris shall be approved by the City and strictly adhered to.

3.3 DEMOLITION

A. The Drawings indicate the general extent of demolition and removal work. Include removal of all existing material which would otherwise interfere with the proper installation or function of new work, whether or not such existing materials or conditions have been indicated.

B. Restore to original condition all existing items to remain that are damaged as a result of work under this Section.

3.4 DISPOSITION OF REMOVED MATERIALS

A. Except for items specifically designated to be relocated, re-used or turned over to the Owner, all existing removed materials and items shall become the property of the Contractor and shall be completely removed from the site and legally disposed of at his expense.

B. Existing items which are not fixed in place and which will remain the property of the Owner will be removed by the Owner prior to commencement of demolition work in existing buildings, unless otherwise indicated.

C. Re-used Items: Items to be salvaged for re-use in the Work include:
   1. Equipment fastenings and brackets if required to be removed to allow installation.

D. All items to be reused shall be carefully removed, disassembled if required; adequately supported and protected during removal operations. Items to be relocated shall be carefully transported to new locations and properly protected.

E. Contractor shall inspect closely each item prior to its' removal and report damage and defects to the Architect. Contractor shall be responsible for any subsequent damage to same other than latent defects not readily apparent from a close inspection, and shall repair or replace same as directed to the satisfaction of the Architect.

3.5 CLEANING UP

A. Refuse and debris resulting from work under this Section shall be removed from the site at daily intervals. Make all required arrangements for legal disposal of such material.

B. Materials shall be thoroughly wetted down during demolition and removal as specified to prevent nuisance of dirt and dust. Trucks used in hauling debris shall be equipped with tarpaulins to cover the loads and shall not be loaded so excessively as to spill debris on streets.

C. Combustible material and rubbish shall not be allowed to accumulate on the site but shall be hauled away daily as directed. No debris shall be burned at job site.

D. At completion of removal work, all rubbish, debris, waste, material and salvaged materials from and about the building and structures, including all tools, scaffolds, apparatus and appliances used in connection with work under this Section shall be removed and the premises shall be left in clean condition ready for alteration work and new construction to be provided under other Sections.

END OF SECTION 02070

SECTION 06100 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section
B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. Framing with dimension lumber.
B. Wood furring, nailers, and blocking.
C. All temporary facilities required such as barricades, sheds, ramps, bracing, supports, temporary doors, stairs, ladders and railings

1.3 RELATED WORK UNDER OTHER SECTIONS: The following Sections contain requirements that relate to this Section:

A. Section 01027 – APPLICATION FOR PAYMENT
B. Section 01040 – COORDINATION
C. Section 01100 – SUMMARY
D. Section 01300 – SUBMITTALS
E. Section 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
F. Section 02070 – SELECTIVE DEMOLITION
G. Section 10505 – LOCKERS
H. Section 15400 – PLUMBING (FILED SUB-BID)
I. Section 15600 – HVAC (FILED SUB-BID)
J. Section 16000 - ELECTRICAL

1.4 DEFINITIONS

A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.

1.5 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for the following products:
   1. Metal framing anchors.
   2. Construction adhesives.

C. Material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use as well as design values approved by the Board of Review of American Lumber Standards Committee.

D. Wood treatment data as follows including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material:
   1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
   2. For water-borne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.
   3. Material test reports from qualified independent testing laboratory indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

4. Warranty of chemical treatment manufacturer for each type of treatment.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility for Engineered Wood Products: Obtain each type of engineered wood products from one source from a single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

1.8 PROJECT CONDITIONS:

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, and similar supports to allow attachment of other work.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:

1. NLGA - National Lumber Grades Authority (Canadian).
2. SPIB - Southern Pine Inspection Bureau.
3. WCLIB - West Coast Lumber Inspection Bureau.
4. WWPA - Western Wood Products Association.

C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber furnish pieces with grade stamps applied to ends or back of each piece; or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.

2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

3. Provide lumber with 15 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2.2 DIMENSION LUMBER

A. For light framing provide "Stud," "No. 3," or "Standard" grade lumber for stud framing (2 to 4 inches thick, 2 to 4 inches wide, 10 feet and shorter) and "Stud" or "No. 3" grade for other light framing (2 to 4 inches thick, 2 to 6 inches wide), any species.

2.3 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WCLIB or WWPA rules or "No. 2 Boards" per SPIB rules.

E. Roof Blocking: Treated wood nailers shall be installed at all new roof top equipment and around such other roof projections. Wood shall be #2 better lumber, and "wolmanized" or pressure-treated with water-borne salts preservatives for fire and rot resistance. Creosote and asphaltic preservatives are not acceptable. Thickness of nailers shall be such that the top of the nailer is flush with the surface to which the membrane is to be applied. Nailers shall be firmly anchored to the deck at a maximum spacing of 3 feet to resist a force of 175 pounds per lineal foot in any direction. One-half inch vent spaces shall be provided between lengths of nailers.

2.4 CONCEALED PERFORMANCE-RATED CONSTRUCTION PANELS

A. General: Where construction panels are indicated for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements designated under each application for grade designation, span rating, exposure durability classification, edge detail (where applicable), and thickness.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power Driven Fasteners: National Evaluation Report NER-272.

D. Wood Screws: ANSI B18.6.1.

E. Lag Bolts: ANSI B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.6 METAL FRAMING ANCHORS

A. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:

1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.

2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis

and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

2.7 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

B. Water Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbonate (IPBC) as its active ingredient.

2.8 PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS

A. General: Where lumber or plywood is indicated as preservative-treated wood or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood). Mark each treated item with the AWPB or SPIB Quality Mark Requirements.

B. Pressure-treat above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. For interior uses, after treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

3. Wood framing members less than 18 inches above grade.

C. Pressure-treat wood members in contact with the ground or fresh water with water-borne preservatives to a minimum retention of 0.40 pcf.

D. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

PART 3 - PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

E. Countersink nail heads on exposed carpentry work and fill holes.

F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

A. Install wood nailers, blocking, and sleepers where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

END OF SECTION 06100

SECTION 07100 – JOINT SEALERS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS and applicable parts of Division 1 as part of this Section.

B. Examine all other sections of the Specification for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all other trades affection, or affected by work to this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 WORK INCLUDED

A. Furnish and install all materials, equipment, labor and services required for all caulking and sealant work as specified herein, as shown of Drawings, or both.

B. The General Contractor will provide all material including caulking, sealants, joint backup and primers necessary to provide complete building envelope seal. Provide sealants at all openings in exterior walls wherever dissimilar materials meet and elsewhere as indicated on Drawings.

C. Provide mastic coating at all loose lintel locations as directed by Architect and indicated on the Drawings.

D. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
1. Control and expansion joints in cast-in-place concrete.
2. Control and expansion joints between architectural precast concrete units.
3. Control and expansion joints in unit masonry.
4. Joints between different materials listed above.
5. Perimeter joints between materials listed above and frames of doors and windows.
6. Control and expansion joints in ceiling and overhead surfaces.
7. Other joints as indicated.

E. Exterior joints in horizontal traffic surfaces as indicated below:
1. Control, expansion, and isolation joints in cast-in-place concrete slabs.
2. Joints between different materials listed above.
3. Other joints as indicated.
4. Tile control and expansion joints.

F. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:
1. Control and expansion joints on exposed interior surfaces of exterior walls.
2. Perimeter joints of exterior openings where indicated.
3. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
4. Perimeter joints between interior wall surfaces and frames of interior doors, windows, elevator entrances and dissimilar materials.
5. Perimeter joints of toilet fixtures.
6. Other joints as indicated.
7. Joints between tops of non-load-bearing unit masonry walls and underside of cast-in-place concrete slabs and beams.
8. Tile control and expansion joints.
9. Interior corners of masonry walls.

G. Interior joints in horizontal traffic surfaces as indicated below:
1. Control and expansion joints in cast-in-place concrete slabs.
2. Other joints as indicated.
3. Control and expansion joints in tile flooring.

1.3 RELATED WORK UNDER OTHER SECTIONS INCLUDING SPECIFICATIONS ON DRAWINGS

A. Section 02070 – SELECTIVE DEMOLITION

B. Section 08110 –STEEL DOOR FRAMES (drawings)
C. Section 08210 – WOOD DOORS (drawings)
D. Section 09250 – GYPSUM DRYWALL SYSTEM (drawings)
E. Section 09500 – ACOUSTICAL TREATMENT (drawings)
F. Section 09651 – LINOLEUM FLOOR COVERING
G. Section 09900 – PAINTING (drawings)
H. Section 102116 – SHOWER AND DRESSING COMPARTMENTS (drawing)
I. Section 123216 - MANUFACTURED PLASTIC LAMINATE CLAD CASEWORK (drawing)

1.4 EXISTING CONDITIONS

A. Examine Drawings indicating provisions for new work. Verify all existing conditions and dimensions before commencing work.

B. The Drawings and this Section set forth the general extent of the new work. The Contractor shall visit the site and examine the existing conditions and shall become familiar with the character, extent and type of new work to be performed hereunder.

C. Submit any questions regarding the extent and character of new work within the time period established for receipt of such questions during the bidding period.

1.5 REFERENCE STANDARDS

A. Work shall conform to codes and standards of the following agencies as further cited herein:
1. FS: Federal Specifications published by the United States Government, available from General Services Administration, Specification and Consumer Information Distribution Service, Washington Navy yard Building 197, Washington, DC.

1.6 SAMPLES AND DATA

A. Submit samples as requested by the Architect of all sealants and primers in accordance with requirements of Division 1.

B. Sealant samples shall be 3" strips joining wood, metal or hardboard. Joint backup sample shall be 6" long, ½" diameter or greater. Foam sealant shall also be 6" long.

C. Submit manufacturer's product description, performance and test data on all materials. Include test data on long-term color retention and fading of exterior sealants.

D. Before ordering materials, obtain Architect's approval.

E. Colors of all materials shall be as selected by the Architect.

F. Provide sealant for wall mockup.

1.7 QUALITY ASSURANCE

A. Materials used in fulfilling the requirements of this Section shall be suitable for each intended use and shall be of the type specified for each category. Materials shall be applied under temperatures required for each type in accordance with the manufacturer's recommendations.

B. In addition to other requirements, compounds shall contain no acid or ingredients that will affect masonry, corrode metal, or have injurious effects on paint.

C. Use proper materials specified herein for each location whether Drawings call for "Caulking" or "Sealant."

D. Submit manufacturer's certification of compliance with these specifications for each material.

1.8 DELIVERY, STORAGE AND HANDLING

A. Each container shall bear an unbroken seal, test number and label of the manufacturer upon deliver at the site. Unlabeled materials will be rejected and shall be removed from the site and replaced with approved materials at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Sealant materials shall be manufactured by:
   1. Mameco International Inc., Cleveland, OH
   2. Tremco Inc., Cleveland, OH
   3. H.S. Peterson, Detroit, MI
   4. Or approved equal.

2.2 SEALANT

A. Exterior Sealant: Shall be a gun-grade two-part non-sagging liquid polyurethane sealant with Shore A hardness of 25, meeting Federal Specification TT-S-227E, Type II, Class A. Sealant shall be equal to "Vulkem 227" as manufactured by Mameco International Inc., Cleveland, Ohio, as approved. Colors shall be as selected by the Architect to match or contract with adjacent materials.

B. Prefabricated Compression Seal: Shall be a cellular strip of extruded neoprene meeting ASTM D2628 continuous in length and of required width for compression to optimal fit. Include adhesive, tools, lubricants as required. Use "E" series by D.S. Brown, CS-200 by M&M Systems, or equal by Acme or Watson-Bowman as approved.

2.3 PRIMER AND BACKER ROD

A. Sealant primers where required shall be liquid type recommended by the sealant manufacturer for each use.

B. Backer Rod: Shall be closed-cell, non-absorbent, polyethylene foam backer rod, Dow Chemical "Ethafoam" or approved equal. Size for each application shall be selected to provide approximately 33% compression when in place. Use backer rod at all exterior joints and elsewhere as indicated or as required. Vinyl foam is not acceptable.

2.4 MASTIC COATING FOR STEEL

A. Mastic: Shall be "Dehydratine No. 10" by Tanoms Industries, "Hydrocide Semi-Mastic" by Sonneborn; Karnak 83, or approved equal.

B. Provide coating over lintels and over all structural steel in contact with exterior masonry.

PART 3 - EXECUTION

3.1 INSPECTION

A. Surfaces to receive mastic and sealants shall be clean, dry and free of oil, dust and loose particles.

B. Before starting work, inspect all surfaces to receive dampproofing, waterproofing and sealant work and report in writing to the Architect any surfaces that are not suitable for application of such material.

C. Unsuitable surfaces shall be corrected before work begins. Commencement of material application to any surface shall constitute acceptance of that surface as proper to receive the work. Subsequent defects in the work shall be corrected under this Section without additional cost to the Owner.

3.2 PREPARATION FOR SEALANTS

A. Notify the proper trades of locations where adequate rabbets for sealant have not been provided; all such rabbets shall be prepared by cutting and cleaning out material to the minimum depth required and by grinding to the minimum width by the appropriate trade.

B. Prepare full depth of joints in concrete, masonry and mortar as required to obtain firm, clean surface. Clean metal surfaces with wire brush where required to remove scale and other deposits and wipe clean with mild, non-staining solvent. Clean other surfaces by methods approved by the sealant manufacturer. Where joint has been mortar filled, rake out existing mortar ¾" deep.

C. Prime surfaces to receive sealing compounds where recommended by manufacturer I accordance with manufacturer's printed instructions.

D. Install continuous lengths of joint backing material in proper size, shape, and depth. Except where otherwise specified or recommended by manufacturer, depth of joints not exceeding ½" in width shall be approximately the same as the width. Depth of joints exceeding ½" in width shall be approximately one half (½) the width of the joint. No sealed joint shall be less than ¼" deep.

3.3 SEALANT APPLICATION

A. Apply sealant only to clean, dry surfaces, and only when the ambient temperature is within manufacturer's recommended range.

B. Application shall be in strict accordance with manufacturer's printed instructions.

C. Apply gun grade sealants with caulking guns of type approved by sealant manufacturer using nozzles sized to fit into joints and drive material with sufficient pressure to fill all voids. Install sealant in continuous, uninterrupted, full length beads. Superficial pointing of joints with a thin bead of compound will not be acceptable.

D. Neatly point and tool all finished joints, concave, uniformly smooth and free of wrinkles, waves, sag lines and other imperfections. Keep outer edge of sealant 1/8" back from face of surrounding material. Remove masking tape immediately after tooling but before sealant has set.

E. Surfaces of all materials adjoining caulked joints shall be fully protected and be kept clean and free of smears of compound or other soiling due to sealant application. Use non-staining masking tape as required.

3.4 PRE-COMPRESSED FOAM SEALANT APPLICATION

A. Surfaces shall be free of oil, grease and rust and dirt. Priming is not required. Follow manufacturer's preparation instructions.

B. Place properly sized foam strip along joint and remove release paper. Apply adhesive side to one side of joint, and press firmly into place. Store material in a cool place on hot days. Material shall expand to fill joint. Follow manufacturer's installation instructions.

3.5 MASTIC COATING OF STEEL

A. Apply mastic coating over all exterior steel loose lintels.

B. Brush-apply heavy mastic coating 1/16" thick in one (1) coat just ahead of masonry work, covering all steel thoroughly.

3.6 COMPRESSION SEAL INSTALLATION

A. Follow manufacturer's instructions for sizing and installing neoprene strip seal. Use tools, adhesives and lubricants as recommended.

B. Recess exposed face of seal ¼" from adjacent surfaces or as shown. Seal shall fill entire opening snugly to prevent water entry. Edges shall be straight and without ripples or wrinkles.

3.7 PROTECTION AND CLEANING

A. Clean all surfaces of adjacent surfaces that have been marked or soiled by work of this Section, removing all excess materials therefrom. Use only cleaning materials and solvents that will not damage the surfaces in any way.

B. Remove all debris and rubbish as the work progresses, and legally dispose of the same.

C. At completion of the work, do final cleaning, leaving the Work and adjacent surfaces in a clean and neat condition.

END OF SECTION 07100

SECTION 096516.13 —VINYL SHEET FLOOR COVERINGS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

A. Examine the GENERAL CONDITIONS for additional requirements which will affect this Section whether or not specifically mentioned in this Section.
B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not specifically mentioned in this Section.
C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 SUMMARY

A. Section include the following:
    1. Resilient Vinyl Sheet Flooring

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specifications Sections
B. Product Data: Submit 3 copies of manufacturer's technical data and installation instructions for each type of resilient flooring and accessory.
C. Shop Drawings:
    1. Show locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
    2. Show details of special patterns.
D. Samples: Submit 3 sets of samples of each type, color and finish of resilient flooring and accessory required, indication full range of color and pattern variation. Provide 6"x9" samples of sheet flooring and 6" long samples of accessories.
E. Closeout Submittals: Submit 3 copies of the following:
    1. Maintenance and operations data includes—methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
    2. Warranty: Warranty documents specified herein.
F. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements
G. Flame Spread Certification: Submit manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread rating has been tested and meets or exceeds indicated standard.
H. Replacement Material: After completion of work, deliver to project site replacement materials from same manufactured lot as materials installed, and as follows:
    1. Tile Flooring: Not less than 50 square feet of each type, pattern and color installed.
    2. Resilient Base: Not less than 10 linear feet for each 500 linear feet or fraction thereof of each different type and color installed.

1.5 QUALITY ASSURANCE

A. Manufacturer: Whenever possible, provide each type of resilient flooring as provided by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

B. Floorcovering Contractor Qualifications:
    1. The Awarded Contractor shall be an established firm, experienced in the installation of the specified product and shall have access to all manufacturers' required technical, maintenance, specifications and related documents.

2. The Floorcovering Contractor shall have completed at least three projects of similar magnitude, material and complexity, and must provide project reference details including contact names and telephone numbers.

C. Installer Qualifications: Installer experienced in performing work of this section who as specialized in installation of work similar to that required for this project.
1. Engage installer certified as a Forbo "Master Mechanic".
2. Proof of Certification; provide proof of certification before start of work.
3. Certified Mechanic(s) must be present on job site daily.

D. Regulatory Requirements: Provide products with the following fire-test response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities have jurisdiction.
1. **E648** -09a Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
2. **E662** -09 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
3. **CAN/ULC-S102.2** Surface Burning Characteristics

1.5 WARRANTY

A. Manufacturer's Warranty: Submit manufacturers standard warranty document.

1. Warranty Period: Five (5) year limited warranty commencing on Date of Substantial completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage and Protection: Store materials protected for exposure to harmful weather conditions and at a temperature and humidity conditions recommended by manufacturer.
1. Materials should be stored in areas that are fully enclosed, weather tight with the permanent HVAC system set at a uniform temperature of at least 68 degrees F (20 degrees C) for 72 hours prior to, during and after installation.
2. The manufacturer recommends move resilient Floorcovering and installation accessories into spaces where they will be installed at least 48 hours before installation, unless longer conditioning periods are required by manufacturer in writing.

1.7 PROJECT CONDITIONS

A. Substrate Conditions:
1. Contractor will have Forbo representative verify condition of floor substrate prior to authorized installation of new linoleum flooring. Contractor will notify Architect and Facilities Manager when floor substrate is considered prepared for new installation and have them present during Forbo verification process.

B. The Floorcovering Contractor shall verify in writing to the Architect, a minimum of ten (10) days prior to scheduled resilient Floorcovering installation, the following substrate conditions:
1. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations.

C. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.
1. Temperature Conditions: 68 degrees F (20 degrees C) for 72 hours prior to and during and for not less than 48 hours after installation.

D. Close spaces to traffic during resilient flooring installation and for time period after installation recommended in writing by the manufacturer.

E. Install resilient flooring material and accessories after other finishing operations, including painting, have been completed.

F. Where demountable partitions and other items are indicated for installation on top of sheet resilient flooring material, install flooring material before these items are installed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include but are not limited to, the following:

1. Linoleum Tile Flooring: To establish a standard of quality, design and performance, Forbo Flooring Systems, "External Step SR" (smooth), .080" (2 mm) has been selected. Alternatives will be considered provided they meet or exceed the specification criteria contained herein. The Architect shall be the sole determinant of equivalency.

2.2 MATERIALS

A. Colors and patterns shall be as selected by Architect. Patterns shall be defined in any given area, applied in stripes, diagonals, checkerboard pattern and other designs as determined by the Architect. All selections shall be made from manufacturer's full product lines.

B. Color Schedule: See Architectural drawings for color schedule, indicated by patterns on drawings, list in reference to this material.
Note: Bidders are advised that this color schedule has been submitted to, and reviewed by the Owner, and shall be finalized during the construction process, approved by the Owner and submitted to the Contractor for execution. Contractors shall take note and are hereafter strongly advised that some material substitutions submitted may be required to be provided with custom colors, textures and finishes based upon this schedule. Material substitutions are subject to being rejected solely on appearance.

C. Vinyl Sheet Flooring: Meets or exceeds ASTM F1303 Standard Specifications for Vinyl Sheet Floor Covering with Backing, Static Load Limit 700 pounds per square inch (per ASTM F970-00), Slip Resistant (per ASTM D 2047), Castor Resistant , polyester backing, 2.0mm (0.080") roll product, unless otherwise indicated. ASTM E-662/NFPA 258 (Smoke Density) 450 or less. ASTM E-648/NFPA 253 (Critical Radiant Flux) Class 1. Vinyl sheet floor covering that has a homogeneous and non-layered vinyl wearing surface that is either smooth (slightly embossed) or studded. The wearing surface, comprised of a high percentage of binder, colorfast pigments, transparent PVC chips and carborundum granules throughout, is supported by a polyglass interlayer to ensure dimensional stability. Eternal Step SR has a large quantity of aluminum oxide and carborundum chips that provide a greater degree of slip resistance than standard project vinyl flooring.

1.2.0mm (0.080") Roll Stock

2.3 ACCESSORIES

A. Adhesive
a. Forbo V885

B. Resilient Edge Strips: homogeneous vinyl or rubber composition, tapered or bull nose edge, color to match flooring, or as selected by Architect from standard colors available, no less than 1" wide.

C. Metal Edge Strips: Of width shown and of required thickness to protect exposed edge of resilient flooring. Provide units of maximum available length, to minimize number of joints.

D. Wall Base: Flash Coving; Extend 4" up wall. Provide Forbo adhesive for flash coving application.

E. Leveling and Patching Compounds: Portland Cement types as recommended by flooring manufacturer.

F. Maintenance Products: (As required in Section 3.5)
   a. Neutral Cleaner: "Stride" by Johnson Wax Professional.
   b. Sealer: "Linobase" by Johnson Wax Professional (specify for at risk installations).
   c. Finish (Gloss Level) "Carefree" by Johnson Wax Professional
      1. Matte-Satin
      2. Gloss

PART 3 - EXECUTION

3.1 INSPECTION

A. Installer must examine areas and conditions under which resilient flooring and accessories are to be installed and must notify General Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Owner and Architect.

3.2 PREPARATION

A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Coordinate with Architect to secure all existing plywood subsurface using flooring screws appropriate for proper securing of plywood underlayment to existing wood structure. Length of fasteners to be sufficient for securing to floor framing. Verify all conditions in field with Architect.

C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

D. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

E. Broom and vacuum clean substrates to be covered immediately before product Installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Condition material in controlled environment of 68° F (20°C) for a minimum of two days (48 hours) prior to, during and two days (48 hours) after the installation.

B. Adhesive Flooring Installation:
   1. Install Flooring material following manufacturer's installation recommendations.
   2. Vinyl Sheet Flooring: Apply adhesive using 1/32" x 1/16" x 1/32" fine notch trowel and lay flooring into wet adhesive and roll with a 100 pound roller to ensure proper bonding,
      a. Follow manufactures recommendations for open and working time.
      b. For wet areas and/or heavy rolling traffic refer to manufacturer recommendations for adhesive type and requirements
   3. Adhesive Material Installation: Use trowel as recommended by flooring manufacturer for specific adhesive. Spread at a rate of approximately 200 sq. ft/gallon as recommended by flooring manufacturer.
   4. Install material into semi-wet adhesive.

C. Vinyl Sheet Flooring Installation Techniques:
   1. General: Comply with tile manufacturer's written installation instructions.

2. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.
3. Extend tiles into toe spaces, door reveals, closets, and similar openings.
4. Maintain reference markers, holes, and openings that are in place or marked for future cuffing by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, non-staining marking device.
5. Adhere to flooring substrates using a full spread of adhesive applied to substrate to comply with tile manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times
6. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
7. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture, including pipes, outlets, edgings, thresholds, nosing and cabinets.
8. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring.
9. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
10. Adhere vinyl flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing to adhesive spreader marks, or other surface imperfections in completed installation
    a. Use adhesive applied to substrate in compliance with flooring manufacturer's recommendations, including those for trowel notching, adhesive mixing and adhesive open and working times.
11. Roll resilient flooring using 100lbs roller as required by resilient flooring manufacturer.

D. Finish Flooring Patterns: As selected and detailed by Architect.

3.4 FIELD QUALITY REQUIREMENTS

A. Manufacture's Field Services: Upon Owner and Architects request, and with a minimum 72 hours notice, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions
    1. Site Visits: As required upon substrate preparation and upon questionable surface conditions as required per project and requested by Architect.

3.5 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Perform initial maintenance on installed products in accordance with manufacturer's instructions, prior to owner's acceptance. Remove construction site debris from project site and legally dispose of debris.

    1. Remove visible adhesive and other surface blemishes using cleaning methods recommended by flooring manufacturer.

    2. Sweep vacuum floor after installation.

    3. Do not perform initial maintenance for a minimum of 5 days after installation has been completed. This is to allow the adhesive the proper time to set.

    4. Damp mop flooring to remove black marks and soil.

B. Materials:

    1. Contractor shall provide first year's annual requirements for maintenance products only, based on materials and procedures listed below. Maintenance products are to be clearly identified and left on site.

C. General Contractor to be responsible for performing initial maintenance to prepare flooring for occupancy following requirements based on procedures listed below.

a. Floorcovering Contractor

1. For product incorporating Forbo Marmoleum's Occupancy Ready Surface

1. Sweep or dust all floors.
2. Scrub floor using "Stride" neutral cleaner. Rinse floor thoroughly. Allow 45 minutes between coats.
3. Apply two (2) coats of "Carefree" Matte-Satin finish. Allow 45 minutes between coats.

3.6 PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion

END OF SECTION 096516.13

SECTION 10505 - LOCKERS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Include GENERAL CONDITIONS as part of this Section
B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SECTION INCLUDES

A. The work to be performed under this contract shall include providing all labor, materials and equipment required to furnish and install metal lockers and all related work necessary for the entire project leaving the lockers 100% operational and all finishes complete at the end of the project.

1.3 RELATED WORK UNDER OTHER SECTIONS: The following Sections contain requirements that relate to this Section:

A. Section 01027 – APPLICATION FOR PAYMENT
B. Section 01030 - ALTERNATES
C. Section 01040 – COORDINATION
D. Section 01100 – SUMMARY
E. Section 01300 – SUBMITTALS
F. Section 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
G. Section 02070 – SELECTIVE DEMOLITION
H. Section 06100 – ROUGH CARPENTRY

1.4 SUBMITTALS:

A. Shop Drawings: Submit complete shop drawings showing layout of lockers, benches, closures, tops and filler panels in each area, locker types, sizes and quantities, including all necessary large scale details of locker and bench construction and relating to anchoring, trim installation and relationship to adjacent surfaces. Provide fastener BOCA reports and catalogue data.
B. Numbering: The locker numbering sequence shall be provided by the approving authority and noted on the approved drawings returned to the locker contractor.
C. Color Charts: Provide color charts showing manufacturer's available colors. If required by normal office procedures or in the event of non-standard color selection, request samples of paint on metal.
D. Samples: Provide samples of each type of door construction with number plate and sample of each type of locking device and accessory item.

1.5 QUALITY ASSURANCE:

A. UNIFORMITY: Provide each type of metal locker as produced by a single manufacturer, including necessary accessories, fittings and fasteners.
B. JOB CONDITIONS: Do not deliver metal lockers until building is ready for locker installation. Protect from damage during delivery, handling, storage and installation.

1.6 GUARANTEES

A. Manufacturer shall guarantee in writing all lockers for not less than ten (10) years from the date of installation against defects in materials and workmanship.
B. Such guarantee shall be in addition to and not in lieu of all other liabilities manufacturer and Contractor may have by law or by other provisions of the Contract.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

A. Products by other manufacturers may be approved provided they meet the detailed specifications written below. Approval procedure shall be as specified in the General Conditions of these locker specifications.

B. LOCKERS:
   1. Locker information:
      a. 149 openings in total. Note: Add Alternative #1 includes three additional Type "A" lockers.
      b. 15" wide X 72" high X 18"deep and 18" wide x 72" high x 18" deep lockers surface mounted on wall construction and set atop 4" high "Z" base. Lockers will be stacked (1) one high with a recessed handle with pad lock additive hasp and sloped top with ends properly terminated.

C. FABRICATION - GENERAL:
   1. MATERIAL: All major steel parts shall be made of mild cold rolled steel, free from imperfections and capable of taking a high grade enamel finish.
   2. FINISH: Surfaces of the steel shall be thoroughly cleaned and phosphatized in a seven-stage process. All parts shall then be finished with a heavy coat of enamel baked on at 300 degrees for 30 minutes.
   3. CONSTRUCTION: Lockers shall be built on the unit principle - each locker shall have an individual door and frame, an individual top, bottom, back and shelves with common intermediate uprights separating units.
   4. DOOR FRAMES: Door frames shall be 14 gauge formed into 1" wide face channel shapes with a continuous vertical door strike, integral with the frame on both sides of the door opening. Double, triple or four tier locker cross frame members shall be 14 gauge channel shaped securely welded to vertical framing members to ensure a square and rigid assembly. Intermediate cross frame members are not required on box lockers.
   5. DOORS: Shall be 14 gauge as required by manufacturer's design, formed with a full channel shape on the lock side to fully conceal the lock bar, channel formation on the hinge side and right angle formation across the top and bottom. Locker doors shall be ventilated by diamond perforation on the face of each door and end panels.
   6. PRE- LOCKING DEVICE: All lockers shall be equipped with a positive automatic pre-locking device, whereby the locker may be locked while door is open and then closed without unlocking and without damaging locking mechanism.
   7. LATCHING: Latching shall be a one-piece, pre-lubricated spring steel latch, completely contained within the lock bar under tension to provide rattle-free operation. The lock bar shall be of pre-coated, double-channel steel construction. The lock bar shall be securely contained in the door channel by self-lubricating polyethylene guides that isolate the lock bar from metal-to-metal contact with the door. There shall be three latching points for lockers. The lock bar travel is limited by contacting resilient high-quality elastomeric cushioning devices concealed inside the lock bar. Frame hooks to accept latching shall be of heavy gauge steel, set close in and welded to the door frame. Continuous vertical door strike shall protect frame hooks from door slam damage. A soft rubber silencer shall be securely installed on each frame hook to absorb the impact caused by closing of the door.
   8. HANDLES: A non-protruding 14 gauge lifting trigger and slide plate shall transfer the lifting force for actuating the lock bar when opening the door. The exposed portion of the lifting trigger shall be encased in a molded ABS thermoplastic cover that provides isolation from metal-to-metal contact and be contained in a formed 20 gauge stainless steel recessed pocket. This stainless steel pocket shall contain a recessed area for the various lock types available and a mounting area for the number plate.
   9. HINGES: Hinges shall be continuous tight pin style, securely welded to frame and securely riveted to the inside of the door flange.
   10. BODY: The body of the locker consists of 18 gauge upright sheets, backs, tops, bottoms and shelves. Tops, bottoms and shelves are flanged on all four sides; backs are flanged on two sides. Uprights shall be offset at the front and flanged at the rear to provide a double lapped rear corner. All bolts and nuts shall be zinc plated.

11. INTERIOR EQUIPMENT: All lockers shall have one hat/book shelf and one double prong back hook and two single prong wall hooks in each compartment. All hooks shall be made of steel, formed with ball points, zinc-plated and attached with two bolts or rivets.

12. NUMBER PLATES: Each locker shall have a polished aluminum number plate with black numerals not less than 1/2'' high. Plates shall be attached with rivets to the lower surface within the recessed handle pocket.
13. COLOR: Doors and exposed body parts to be finished in colors selected from manufacturer's full collection of standard colors.
14. ASSEMBLY: Assembly of all locker components shall be pre-assembled with all seams and joints welded on 6" centers for rigidity and durability. No bolts, screws or rivets shall be used in the assembly of the locker bodies
15. Accessible Lockers: Five (5) percent of lockers shall have hat shelf less than 48" above finished floor and locker bottom at 9" above finished floor. Doors shall have recessed accessible handles; accessible lockers shall be equally distributed throughout facility. Number plates shall be adjusted to accommodate appropriate numbering and symbols per MAAB.

D. LOCKER SEATING:
1. Laminated Hardwood with Enameled Steel Pedestal Design. Benches will be 9 ½" wide x 18" high by length shown on drawings. Anchor to floor using expansion type bolts suitable for concrete floor attachment, see details on drawings.
2. Each locker will be provided a locker stool constructed of 1 ¼" thick solid maple top upon four 7/8" diameter pre-finished steel legs, color as selected by Architect. Stool height will be 20" high fixed height and will have bracing stretchers riveted and welded in place for secure stability, rigidity and durability.

PART 3 - EXECUTION

3.1 REMOVAL/DISPOSAL:

A. Existing lockers must be removed and disposed of legally as part of this contract. The School Department's dumpsters are not to be used for any refuse associated with this project. Existing wall openings must be vacuumed clean by the contractor prior to the installation of the new lockers.

3.2 INSTALLATION

A. Lockers must be installed in accordance with manufacturer's approved drawings and assembly instructions. Installation shall be level and plumb with flush surfaces and rigid attachment to anchoring surfaces. Space fasteners at 36'' O.C. or less, as recommended by manufacturer. Use fasteners appropriate to load and anchoring substratum. Use reinforcing plates wherever fasteners could distort metal. Various trim accessories where shown, such as sloping tops, fillers, bases, recessed trim, etc., shall be installed using concealed fasteners. Flush, hairline joints are provided at all abutting trim parts and at adjoining surfaces.

3.3 ADJUSTMENT

A. Upon completion of installation, inspect lockers and adjust as necessary for proper door and locking mechanism operation. Touch up scratches and abrasions with factory-supplied paint to match original finish.

3.4 QUALITY ASSURANCE

A. Single-source responsibility for all lockers and accessories.
B. NOTE: For user safety, all lockers must be secured to the wall and/or floor prior to use.

3.5 CLEAN UP

A. Upon completion of installation, test, clean and touch up all units.
B. Test each door, latch, and locking device, and make necessary adjustments required to ensure a bind-free operation and proper latching and locking.

C. Remove all tape and other packing material from locker and bench surfaces, and thoroughly clean and polish all exterior and interior surfaces of the units.
D. Touch-up all scratches and other surface defects, using same materials and colors as shop finish.

END OF SECTION 10505

SECTION 15400 PLUMBING

PART 1 - GENERAL

PART 2 - PRODUCTS

PART 3 - EXECUTION

SECTION 15400

PLUMBING

PART 1 - GENERAL

1.00 GENERAL REQUIREMENTS:

A. Examine the GENERAL CONDITIONS for additional requirements which will affect this Section whether or not specifically mentioned in this Section including Section 00100 - INSTRUCTION TO BIDDERS.

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.01 SUMMARY OF WORK

A. Project Identification: As follows:

1) Project: **WALTHAM HIGH SCHOOL**
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM

2) Owner: **Waltham School Department**
City of Waltham
617 Lexington Street
Waltham, MA 02452

B. Contract Documents, dated May 30, 2012, were prepared by JFF Design, Architects, 24 Warwick Avenue, Waltham, MA 02452, (781) 899-6908.

C. The Work consists of but not limited to the complete rehabilitation of three existing rooms within the existing Waltham High School and work to the extent and as delineated and as described in the Contract Documents. Work associated with the Filed Sub-Bid categories, Mechanical, Electrical and Plumbing, will be performed by those Sub-Bidders.

1. Chef's Kitchen:

a. Limited selective demolition occurs in the Chef's Kitchen including complete removal of existing VCT tile floor and preparation for new sheet linoleum flooring product.
b. Repair and patch of all walls from newly installed utilities and existing pock marks.
c. Installation of new ceiling systems as delineated on the Architectural Construction Documents.
d. Complete layout, procurement of equipment and rough and final connections of all kitchen equipment in accordance with the Construction Documents.

e. Installation of new lighting scheme, fixtures and other electrical / fire alarm and safety equipment in accordance with the Construction Documents.
f. All coring to be the responsibility of the associated Filed Sub-Bigger for whose trade the coring is required. They will equally be responsible for sealing all cores with appropriate fire rating material upon completion of their work.

2. Cosmetology Lab:

   a. Limited selective demolition occurs in the Cosmetology Lab including but not limited to new saw-cut trenching, removal of concrete and installation of new packing material and concrete to match existing floor level for installation of new soil waste line for new sink units. This work to be performed by the Plumbing Filed Sub-Bidder.
   b. The complete removal of existing VCT tile floor and preparation for new sheet linoleum flooring product.
   c. Installation of new part-height wall as detailed in the Construction Documents for concealing new piping associated with new sink units.
   d. Complete layout, procurement of equipment and rough and final connections of all cosmetology equipment in accordance with the Construction Documents.
   e. Removal of existing 2 x 4 acoustical ceiling tiles, cleaning and painting of the existing grid and the installation of new light fixtures and acoustical ceiling tiles in accordance with the Construction Documents.
   f. Painting of all new wall construction in accordance with the Construction Documents.

3. Title IX Locker Room:

   a. Extensive selective demolition occurs in the Title IX Locker Room including complete removal of existing shower stalls, associative piping (to be removed by Plumbing Filed Sub-Bidder) and required concrete slabs and replacement for smooth floor transition and patching.
   b. Painting of entire area of work for new wall and floor material in accordance with Construction Documents.
   c. Procurement, preparation and installation of new lockers and benches.
   d. Manufacturer and installation of metal security grates in accordance with Construction Documents.
   e. Procurement and installation of new overhead projection device.
   f. Attention to add alternative work as prescribed in the Alternates Section 01030 and in accordance with the Construction Documents.

4. Provide all demolition shown on the plans and as necessary to accomplish all the work of the contract. Please note that all the demolition and patching for the Mechanical, Electrical and Plumbing work shall be performed by the Mechanical, Electrical and Plumbing Filed Sub-Bidder.

5. Patching: The General Bidder shall own ALL patching to existing walls, floors and ceilings that are disturbed by any of the demolition activities outside of

the Filed Sub-Bid categories. Patching shall match existing adjacent materials and finish (including texture).

6. Filed Sub-Bid Demolition includes the demolition of any and all existing building materials, finishes, systems and/or equipment that is required to be removed in order to perform the work of the Filed Sub Bid, including disposal. Patching shall match existing adjacent materials and finish (including texture).

1.02 WORK RESTRICTIONS

1. Contractor's Use of Premises: During construction, Contractor shall have limited use of building as indicated. Contractor's use of premises is limited to the area of the work and access to the area of work.

2. Work to be performed around the normal school hours, summer school and weekend building use schedules. Work to be performed during school summer hours until August 28, 2012, Monday – Friday 7 AM – 5 PM, are assumed normal hours. Hours worked outside of this time frame are available to all Contactors and Sub-Contractors and additional cost will not be authorized nor considered. Contractor shall maintain a minimum of two paths of egress from all intersecting spaces and corridors. The actual paths of egress shall be coordinated in the field with the Architect and Director of Facilities prior to the commencement of work in any given area. The Contractor will coordinate these areas with the School Administration, Director of Facilities and Architect. If work continues beyond the start of school, August 29, 2012; the Contractor will coordinate working time with the Director of Facilities and Architect outside of normal school hours. Work continuing beyond August 29, 2012, with exception to holiday or school vacation time, will be allowed Monday – Friday from 2:15 PM – 11 PM, with both Saturday and Sunday available. The adjusted "school session" hours are considered normal work time with respect to the project and additional cost will not be authorized nor considered.

1.03 SCOPE OF WORK

A. Work Included: The scope of work, without limiting the generality thereof, consists of furnishing all labor, materials, plant, transportation, equipment, accessories, appurtenances, and services necessary and/or incidental to the proper completion of all plumbing work shown on the drawings, described in the specifications, or as reasonably inferred from either, in the opinion of the Architect, as being required, and includes, but is not limited to:

- Soil waste and vent piping systems
- PVC piping for shampoo sinks
- Kitchen Waste piping System
- Domestic Hot Water, Cold Water and Tempered Water Piping
- Natural gas piping system to Kitchen Equipment and appliances as required
- Valves
- Insulation
- Plumbing fixtures and trim
- Piping of all Kitchen Equipment
- Floor Drains
- Instructions
- Hose bibbs

- Core drilling
- Furnishing of access panels
- Testing, disinfection and certification
- Record drawings
- Hangers, sleeves and appurtenances
- Cleaning and adjusting
- Supplementary testing and disinfection
- Guarantees
- Pipe identification
- Staging, scaffolding, rigging and hoisting
- Co-ordination
- Backflow Preventers
- Demolition
- Shut-down
- Thermostatic Mixing Valves

B. RELATED WORK SPECIFIED ELSEWHERE

1. Finish Painting.
2. Temporary power for operation of pipe cutting, welding and threading tools.
3. Electrical power and wiring.
4. Heating Work.
5. Concrete housekeeping pads.
6. Installation of access panels - Trades in which they occur.
7. Excavation, backfill and resurfacing.
8. Toilet accessories.
9. Flashing.

1.04 CODES, STANDARDS AND REFERENCES

A. All materials and workmanship shall comply with all applicable State Codes, Specifications, Local and State Ordinances, Industry Standards and Utility Company Regulations latest editions.

B. In case of difference between State Building Codes, State Laws, Local Ordinances, Industry Standards, Utility Company Regulations and the Contract Documents, the Plumbing Subcontractor shall promptly notify the Architect in writing of any such difference.

C. In case of conflict between the Contract Documents and the requirements of any Code, Authorities having jurisdiction, the most stringent requirements of the aforementioned shall be included in the bid and assume that will be provided unless otherwise directed by the Architect after award of Contract.

D. Should the Plumbing contractor perform any work that does not comply with the requirements of the applicable Building Codes, State Laws, Local Ordinances, Industry Standards and Utility Company Regulations, he shall bear all costs arising in correcting the deficiencies, as approved by the Architect.

1. Applicable Codes and Standards shall include all State Laws, Local Ordinances, Utility Company Regulations and the applicable requirements of the following accepted Codes and Standards, without limiting the number, as follows:
2. National Electrical Code (NEC)
3. Environmental Protection Agency (EPA)
4. National Standard Plumbing Code (NSPC)

5. MSBC 8th Edition
6. Local Ordinances
7. Recommendations of the National Fire Protection Association (NFPA), in general and in particular:

    1. Life Safety, NFPA 101, 2006 Life Safety Code

E. In these specifications, references made to the following Industry Standards and Code Bodies are intended to indicate the accepted volume or publication of the Standard. All equipment, materials and details of installation shall comply with the requirements and latest revisions of the following Bodies, as applicable:

1.	ANSI	American National Standards Institute
2.	ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
3.	ASME	American Society of Mechanical Engineers
4.	ASTM	American Society of Testing Materials
5.	AWS	American Welding Society
6.	CS	Commercial Standards, U.S. Department of Commerce
7.	FM	Factory Mutual
8.	NFPA	National Fire Protection Association
9.	CGA	Compressed Gas Association
10.	FS	Federal Specification, U.S. Government
11.	HI	Hydraulics Institute
12.	MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
13.	NEMA	National Electrical Manufacturers Association
14.	OSHA	Occupational Safety and Health Act
15.	UL	Underwriters' Laboratories, Inc.

F. The Plumbing contractor for the work shall give all necessary notices, obtain all permits, pay all governmental taxes, fees and other costs in connection with his work; file for necessary approvals with the jurisdiction under which the work is to be performed. The Plumbing Subcontractor shall obtain and pay for all required Certificates of Inspection for his work and deliver same to the Architect before request for acceptance of his portion of work is made and before final payment.

1.05 GUARANTEE

A. Attention is directed to provisions of the General Conditions and Supplementary General Conditions regarding guarantees and warranties for work under this Contract.

B. Manufacturers shall provide guarantees for work under this Contract. However, such guarantees shall be in addition to, and not in lieu of, all other liabilities which the manufacturer and the Contractor may have by Law or by other provisions of the Contract Documents. In any case, such guarantees and warranties shall commence when the Owner accepts the systems, as determined by the Architect and shall remain in effect for a period of (12) months thereafter.

C. All materials, items of equipment and workmanship furnished under each Section shall carry the standard warranty against all defects in material and workmanship. Any fault due to defective or improper material, equipment, workmanship or design which may develop shall be made good, forthwith, by and at the expense of the Plumbing Subcontractor, including all other damage done to areas, materials and other systems resulting from this failure.

D. The Plumbing contractor shall guarantee that all elements of the systems provided under his Contract, are of capacity to meet the specified performance requirements as set forth herein or as indicated on the drawings.

E. Upon receipt of notice from the Owner of failure of any part of the systems or equipment during the guarantee period, the affected part or parts shall be replaced by the Plumbing Subcontractor, within (3) working days, at no cost to the Owner.

F. The Plumbing contractor shall furnish, before the final payment is made, a written guarantee covering the above requirements.

1.06 THE SUBCONTRACTOR

A. The Plumbing contractor shall base his bid on site examinations performed by him. This requirement is mandatory. The Plumbing contractor shall visit the site of the proposed Project where work is scheduled to be performed, to ascertain for himself the amount of work required and complexity of the installation. The Plumbing contractor shall not hold the Architect or his agents or employees responsible for, or bound by, any schedule, estimate or of any plan thereof. The Plumbing Subcontractor shall study all Contract Documents included under this Contract to determine exactly the extent of work provided under each Section, as well as to ascertain the difficulty to be encountered in performing the work, as shown on the drawings, outlined herein, and in installing new equipment and systems and coordinating the work with the other Trades and existing conditions. Any discrepancies noted between the Contract Documents and existing conditions must be brought to the Architect's attention prior to the submission of bids.

B. The Plumbing contractor shall faithfully execute his work according to the terms and conditions of the Contract and specifications and shall take all responsibility for and bear all losses resulting to him in the execution of his work.

C. The Plumbing contractor shall be responsible for the location and performance of work provided under his Contract as indicated on the Contract Documents. All parties employed directly or indirectly by the Plumbing Subcontractor shall perform their work according to all the conditions as set forth in these specifications.

D. The Plumbing contractor shall furnish all materials and do all work in accordance with these specifications and any supplementary documents provided by the Architect. The work shall include every item shown on the drawings and/or required by the specifications as interpreted by the Architect. All work and materials furnished and installed shall be new and of the best quality and workmanship. The Plumbing contractor shall cooperate with the Architect so that no error or discrepancy in the Contract Documents shall cause defective materials to be used or poor workmanship to be performed.

1.07 COORDINATION OF WORK

A. The Plumbing contractor shall compare his drawings and specifications with those of other Trades as well as the Architectural drawings and specifications, and report any discrepancies between them to the Architect and obtain from the Architect written instructions for changes necessary in the plumbing work. All work shall be installed in cooperation with other Trades installing interrelated work. Before installation, Plumbing contractor shall make proper provisions to avoid interferences in a manner approved by the Architect. All changes required in the plumbing work caused by the Plumbing contractor's neglect, shall be made by him at his own expense, to the Architect's satisfaction. The Plumbing contractor must include in his bid sufficient dollar amounts to coordinate the work of this Contract.

B. Locations of pipes and equipment shall be adjusted to accommodate the work with interferences anticipated and encountered. The Plumbing contractor shall determine the exact routing and location of his systems prior to fabrication or installation of any system component.

C. Lines which pitch shall have the right-of-way over those which do not pitch. For example, sanitary and waste piping shall normally have the right-of-way. Lines whose elevations cannot be changed shall have the right-of-way over lines whose elevations can be changed.

D. Offsets, transitions and changes of direction in all systems shall be made as required to maintain proper headroom and pitch of sloping lines whether or not indicated on the drawings. The Plumbing Subcontractor shall provide cleanouts and drains as required for his work to effect these offsets, transitions and changes in direction.

E. All work shall be installed in a way to permit removal (without damage to other parts) of coils, filters, control appurtenances, shafts, sheaves and drives and all other system components provided under this Contract requiring periodic replacement or maintenance. All piping shall be arranged in a manner to clear the openings of swinging overhead access doors as well as ceiling tiles. All work shall be done to allow easy access for maintaining equipment. The Owner and Engineer will require proof via the preparation of large scale sections and part plans that valves, cleanouts, etc. are accessible after the work is completed. Any items in the field discovered to be in non-compliance shall be removed and relocated, as required, and as directed by the Architect.

F. The Contract Drawings are diagrammatic only intending to show general runs and locations of piping, equipment, terminals and specialties and not necessarily showing all required offsets, details and accessories and equipment to be connected. All work shall be accurately laid out with other Trades to avoid conflicts and to obtain a neat and workmanlike installation which will afford maximum accessibility for operation, maintenance and headroom.

G. Where discrepancies in scope of work as to what Trade provides items, such as starters, disconnects, flow switches, etc., exist, such conflicts shall be reported to the Architect during bidding and prior to signing of the Contract. If such action is not taken, the Plumbing contractor shall furnish such items as part of his work as necessary, for complete and operable systems and equipment, as determined by the Architect.

H. The Plumbing contractor shall coordinate the installation of all equipment or service platforms provided.

I. Where drawing details, plans, specification requirements and/or scheduled equipment capacities are in conflict and where pipe sizes of same pipe are shown to be different between plans and/or between plans and sections or details, the most stringent requirement will be included in the Contract. Plumbing systems and equipment called for in the specification and/or shown on the drawings shall be provided under this Contract as if it were required by both the drawings and specifications. However, prior to ordering or installation of any portion of work which appears to be in conflict, such work shall be brought to Architect's attention for direction as to what is to be provided.

J. Final location of all exposed control valves, control devices, wall hydrants, hose bibbs etc., shall be coordinated with the Architectural reflected ceiling plans and/or other Architectural details, as applicable. Obtain approval of locations of all devices from Architect in the field. Washers and dryers or other type of equipment shown on the plumbing and/or Architectural drawings to be provided with services, shall be included under this Contract as applicable, including all piping connections to systems, to make equipment complete and operable. Additional piping, flexible fittings, etc., shall be provided to accomplish the above

requirement, as required, all as part of this Contract, at no extra cost to the Owner. This requirement necessitates that the Plumbing contractor review the architectural drawings and the drawings of other Trades during bidding to ascertain the extent of all requirements, and interface between the Trades and scope of work.

K. The Plumbing contractor shall coordinate his work with other Trades' work so that all equipment and systems can be easily, safely and properly serviced and maintained. It is imperative that service personnel can safely access all equipment. Provide safety rails, steps, ladders, valve chains, handle extensions, etc. as required, in addition to the ones shown on the drawings, to ensure safe and easy access to all equipment and is provided in a manner approved by the Architect.

1.08 GIVING INFORMATION

A. The Plumbing contractor shall keep himself fully informed as to the shape, size and position of all openings required for his apparatus and shall give information to the Architect and other Contractors sufficiently in advance of the work so that all openings may be built in advance.

1.09 EQUIPMENT AND MATERIALS

A. Equipment and materials shall be delivered to the site and stored in location as directed by the Architect, in original sealed containers, suitably sheltered from the elements, but readily accessible for inspection by the Architect until installed. All items subject to moisture damage such as controls, filters, etc., shall be stored in dry, heated spaces.

B. The Plumbing contractor shall have his equipment tightly covered and protected against dirt, water and chemical or mechanical injury and theft. At the completion of the work, equipment and materials shall be cleaned, polished thoroughly and turned over the Owner in a condition satisfactory to the Owner and Architect. Damage or defects developing before acceptance of the work shall be made good at the Plumbing contractor's expense.

C. The Plumbing contractor shall make necessary field measurements to ascertain space requirements, for equipment and connections to be provided under his Trade and shall furnish and install such sizes and shapes of equipment to allow for the final installation to conform to the drawings and specifications.

D. The manufacturers listed within this specification establish the standards of quality required, either by description or by references to brand name, name of manufacturers or manufacturer's model number. Where one product only is specifically identified by name or manufacturer's model number, the Plumbing contractor shall base his bid on the use of the name product. Where multiple names are used, the Plumbing contractor shall base his bid on the use of any of those products named. The Plumbing contractor shall submit with his bid, the names of products which are proposed as substitutions for products named in the specifications. Each proposed substitution shall be accompanied by a written statement of money to be added or deducted from his bid. The Owner reserves the sole right to accept or reject said substitutions with or without cause. When equipment and/or materials are proposed to be purchased from a manufacturer other than those specified, the Plumbing contractor shall provide with his bid, data sufficient to inform the Owner and Engineer of the basis of equality of the substitution to that of the equipment and/or materials specified. When equipment other than that specified is used, the Plumbing contractor shall be solely responsible for any extra cost of required revisions such as structural steel, concrete, electrical, piping, and any engineering review, coordination with other Trades, or redesign, etc. Such additional cost shall be identified at the time such substitutions are proposed and incurred by the Plumbing contractor.

E. Manufacturers' directions shall be followed completely in the delivery, storage, protection and installation of any equipment. Promptly notify the Architect in writing of any conflict between any requirements of the Contract Documents and the manufacturer's directions and obtain the Architect's written instructions before proceeding with the work. Should the Plumbing contractor perform any work that does not comply with the manufacturer's directions or written instructions from the Architect, he shall bear all costs arising in correcting any deficiencies that should arise.

F. The Plumbing contractor shall furnish and install all equipment, accessories, connections and incidental items necessary to fully complete the work under his Contract for use, occupancy and operation by the Owner.

G. Where equipment of the acceptable manufacturers requires different arrangement or connections from those shown, it shall be the responsibility of the Plumbing contractor to install the equipment to operate properly and in harmony with the original intent of the drawings and specifications. When directed by the Architect, the Plumbing Subcontractor shall submit drawings showing the proposed installation. If the proposed installation is approved, the Plumbing Subcontractor shall make all necessary changes in all affected related work provided under other Sections including location of roughing-in connections by other Trades, electrical requirements, piping, supports, insulation, etc. All changes shall be made at no increase in the Contract amount or additional cost to the other Trades and/or Owner.

H. All equipment and materials required for installation under these specifications shall be new and without blemish or defect. Equipment and materials shall be products which will meet with the acceptance of the Authorities having jurisdiction over the work and as specified hereinbefore. Where such acceptance is contingent upon having the products listed or labeled by FM, UL or other testing laboratories, the products shall be so listed or labeled. Where no specific indication as to the type or quality of material or equipment is indicated, a first class standard article shall be provided.

I. All equipment of one type (such as valves, piping, heaters, drainage specialties, etc.), shall be the product of one manufacturer.

J. Equipment furnished by the Owner, if assigned to the Plumbing contractor, shall be received, inspected, installed, etc., as if they were purchased by the Plumbing Subcontractor. All guarantees, service contracts, etc., shall be the same as for all other equipment provided under this Contract. Make all connections, and provide all piping and controls as necessary.

1.10 CUTTING AND PATCHING

A. The Plumbing contractor shall be responsible for all core drilling, as required for work under his Contract, but in no case shall he cut into any structural elements without the written approval of the Architect.

B. All cutting, rough patching and finish patching shall be provided under this Contract.

C. All concrete and masonry equipment bases and pads shall be provided by the Other Work Contractor.

1.11 USE OF PREMISES

A. The Plumbing contractor shall confine all of his apparatus, storage of materials and construction to the limits indicated on the drawings and directed by the Architect and he shall not encumber the premises with his materials.

B. In storing materials within areas (structure or ground), or when used as a shop, the Plumbing contractor shall consult with the other work Contractor and shall restrict his storage to space designated for such purposes. The Plumbing Subcontractor will be held responsible for repairs, patching or cleaning arising from any unauthorized use of premises.

C. Notwithstanding any approvals or instructions which must be obtained by the Plumbing contractor from the Architect in connection with use of premises, the responsibility for the safe working conditions at the site shall remain the Plumbing Subcontractor's and the Architect or Owner shall not be deemed to have any responsibility or liability in connection therewith.

1.12 PROTECTION

A. All materials such as valves, fittings, piping, etc., shall be properly protected and all piping openings shall be temporarily closed by the Plumbing contractor installing same, so to prevent obstruction and damage. The Plumbing contractor shall take precautions to protect his materials from damage and theft.

B. The Plumbing contractor shall furnish, place and maintain proper safety guards for the prevention of accidents that might be caused by the workmanship, materials, equipment or electrical systems provided

1.13 DAMAGE TO OTHER WORK

A. The Plumbing contractor shall be held responsible and shall pay for all damages caused by his work to the new building structures and equipment, piping, etc., and all work and finishes installed under this Contract in the new or in existing building. Repair of such damage shall be done as hereinbefore specified, at the expense of the Plumbing Subcontractor and to the Architect's satisfaction.

1.14 CORRECTION OF WORK

A. The Plumbing contractor shall promptly correct all work provided under his Contract and rejected by the Architect as defective or as failing to conform to the Contract Documents whether observed before or after completion of work and whether or not fabricated, installed or completed. The Plumbing contractor shall bear all costs of correcting such rejected work.

B. The above requirements will also apply to work observed to be in conflict with 22000-7 "Coordination of Work" as it relates to installations not allowing accessibility to all system components.

1.15 EXTRA WORK

A. No claim for extra work will be allowed unless it is authorized by the Architect in writing before commencement of the extra said work.

1.16 TOUCH-UP PAINTING

A. The Plumbing contractor shall thoroughly clean all equipment and systems provided under this Contract from rust, splatters and other foreign matter or discoloration, leaving every part of each system in an acceptable prime condition. The Plumbing contractor, for the work under his Contract, shall refinish and restore to the original condition all equipment and piping which has sustained damage to the manufacturer's prime and finish coats of paint and/or enamel.

1.17 PIPE SLEEVES, PLATES AND ESCUTCHEONS, FIRESTOPPING AND SMOKEPROOFING

A. Where pipes pass through ALL walls or floors, the Plumbing contractor shall provide and set individual sleeves for each pipe and all other work under his charge, as necessary for passage of all pipes. Sleeves shall be of sufficient size to provide 1/2" air space around the pipe passing through (including insulation where pipes are insulated). Where pipes are to be insulated, insulation shall run continuous through sleeves. All openings shall be sealed, smokeproofed and made tight. The Plumbing contractor shall be responsible for the exact location of sleeves provided under this Contract and shall coordinate all requirements for piping sleeves.

B. The Plumbing contractor, for work under his charge, shall determine the required inside diameter of each individual wall opening or sleeve before ordering, fabrication or installation, and he shall prepare sleeving and opening draining for the use of these drawings by the other work contractor.

C. Sleeves and inserts shall not be used in any portions of the building, where their use would impair the strength or construction features of the building. Elimination of sleeves must be approved by the Architect.

D. Provide chrome-plated brass escutcheons with set screw for exposed piping, in all areas except in mechanical rooms. In these areas use plain brass or cast iron escutcheons suitable for painting. All escutcheons shall be sized to fit the bare pipe or insulation in a snug and neat manner. They shall be of sufficient size to cover sleeved openings for the pipes and of sufficient depth to cover sleeves projecting above floors. Escutcheons shall be as manufactured by Beaton & Caldwell, Dearborn Brass or Grinnell.

E. Pipe sleeves shall be made of Schedule 40 pipe, 20 gauge galvanized steel or 16 gauge steel as follows:

1. Sleeves on pipes passing through masonry or concrete construction shall be Schedule 40 pipe.
2. Sleeves on pipes passing through drywall construction shall be 20 gauge galvanized steel.
3. Sleeves on pipes passing through fire rated drywall partitions shall be 16 gauge steel.

F. Pipe sleeves shall be set as follows:

1. Set sleeves 1" above finish floor and flush on each side of walls, except sleeves through floor occurring in walls and partitions shall terminate 1" above the finished floor.
2. Sleeves shall be set securely in place before concrete is poured.

G. The Plumbing contractor shall firestop or smokestop the space between the sleeves provided under his Contract and pipes as applicable, as follows:

1. Materials shall bear label issued by qualified laboratory and specifically indicating that the product has been tested to ASTM E814 Standard, shall be as manufactured by Bio Fireshield Inc. or Dow Corning Corp., and shall include the following:

    1. Dow Corning silicone RTV foam (penetration fill material) complete.
    2. Dow Corning 96-081 RTV silicone adhesive sealant.
    3. Mineral fiber board, mineral fiber matting, and mineral fiber putty may be utilized for forming and damming materials used to contain the liquid silicone RTV foam mixture prior to and during foam-filling penetrations. Damming and forming materials shall be fire tested and functionally approved and shall be capable of being left in place to become an integral part of the foamed penetration wall.

2. Materials shall be delivered in their original, tightly sealed containers or unopened packages, all clearly labeled with the manufacturer's name, product identification and lot numbers where appropriate.
3. Installation shall comply with the following:

    1. Penetration seal preparation shall include use of the procedures, techniques and quality control standards recommended by the product manufacturer, as follows:

        a. Remove all incidental combustible materials and loose impediment from the penetration opening and involved surfaces.
        b. Remove free liquids or oil from all involved surfaces and penetration components.
        c. Install the specified damming materials to accommodate and insure the proper thickness/fire rating requirements and provide containment during foaming.
        d. Foam mixing and dispensing of equipment and materials shall be in strict accordance with manufacturer's instructions.
        e. The materials installation procedures, clean-up, safety precautions and requirements shall be in accordance with Dow Corning published information relative to "Safe Handling Procedures", use of safety shoes, goggles, etc.
        f. All firestopping materials must be applied in direct accordance with their UL label certification.
        g. The Plumbing contractor shall submit a mockup of every type of firestopping method used on this project for approval by the Architect at the site. The firestopping methods must be approved prior to installation of systems.

H. Except as otherwise specified, underground piping passing through walls, foundation slabs on grade, shall have penetration closures of the modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous belt around the pipe and with a pressure plate under each bolt head and nut. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely watertight seal between the pipe and wall, reducing chances of cathodic reaction between these members. The Plumbing Subcontractor for work under his charge shall determine the required inside diameter of each individual wall opening or sleeve before ordering, fabrication or installation. The inside diameter of the wall opening shall be sized to fit the pipe and ensure a watertight joint.

Where applicable, when installing seals, take into account the pipe O.D. if non-standard due to coating or jacketing.

1.18 WATERPROOFING, FLASHING AND COUNTERFLASHING

A. Unless specifically indicated otherwise on the drawings, the Plumbing contractor shall provide all counterflashing and waterproofing of all piping and equipment provided by him, which pierce roofs, walls and other weather barrier surfaces. All work under this Section shall be coordinated with the Other Work Contractor.

B. All work shall be performed in a workmanlike manner to ensure weatherproof installation. Any leaks developed due to this Contractor's work shall be repaired at his expense, to the Architect's satisfaction.

C. Pipes passing through slabs shall have the sleeve extended above floors as hereinbefore specified to retain any water and the space between the pipe and sleeve caulked with lead wool. The top shall be sealed with lead and the bottom shall be sealed with monolastic caulking compound.

D. All flashing required for piping penetrations shall be provided by the Contractor. The Plumbing contractor shall provide and install counterflashing to overlap the base flashing by 4". Flashing shall be fastened with matching clamp rings or by brazing, welding or soldering.

1.19 MISCELLANEOUS IRON AND STEEL

A. The Plumbing contractor shall provide all steel supports and hangers as shown on the drawings or required to support all equipment, systems or materials provided under this Contract.

B. All work shall be cut, assembled, welded and finished by skilled mechanics. Welds shall be ground smooth. Stands, brackets and framework shall be properly sized and strongly constructed.

C. Measurements shall be taken on the job and worked out to suit adjoining and connecting work. All work shall be done by experienced metal-working mechanics. Members shall be straight, true and accurately fitted.

D. Welded joints shall be ground smooth where exposed. Drilling, cutting and fitting shall be done as required to properly install the work and accommodate the work of other Trades as directed by them.

E. Members shall be generally welded except that bolting may be used for field assembly where welding would be impractical. Welders shall be skilled and certified. Bolts, nuts and washers shall be high tensile type, minimum 3/4" diameter, conforming to ASTM.

F. All shop and field fabricated iron and steel work shall be cleaned and dried and given (1) coat of rust inhibiting paint on all surfaces and in all openings and crevices.

1.20 ELECTRICAL WORK

A. The Electrical contractor shall provide power wiring to all equipment provided under Section 15400. All control wiring shall be installed in conduits and in accordance with the respective equipment manufacturer requirements. All connections shall be provided by the Plumbing contractor. All conduit and wiring provided by the Plumbing contractor shall be

B. All electrical apparatus and controls furnished as a part of the plumbing work shall conform to applicable requirements under Electrical Section.

C. The Plumbing contractor shall provide the Electrical contractor with all motor size and wiring requirements within (30) days from date of Contract to allow proper coordination of Trades by the other work Contractor.

D. The Plumbing contractor shall verify with the Electrical Subcontractor available electrical characteristics before ordering any equipment or motors.

E. Equipment which includes a number of correlated electrical control devices mounted in a single enclosure or on a common base with equipment, shall be supplied for installation completely wired internally with terminal strip ready for external wiring. Unless specifically directed otherwise in the Contract Documents, if these control devices are separately mounted they shall be furnished by the Plumbing contractor and wired by Electrical contractor in accordance with the manufacturer's wiring diagram, as shown on the drawings and as specified hereinafter.

1.21 IDENTIFICATION OF MATERIALS

A. All equipment used in the plumbing systems shall have a permanently attached nameplate identifying the manufacturer, service, size, serial number or model number, etc. The nameplates shall be kept clean and readable at all times.

B. Each item of equipment such as pumps, etc., shall be identified by a permanently attached nameplate made of black surface, white core laminated bakelite with 1" high indented letters. Nameplates shall be minimum 5" long by 3" wide and bear the equipment name as designated in the specifications. Nameplates shall be as fabricated by Seton Nameplate Co., Atlantic Engraving Co., W.H. Brady Co., or approved equal. Attach with screws or rivets only.

C. A legend showing the service and an arrow indicating the direction of flow shall be applied on each pipe installed by the Plumbing contractor. Indication shall be by stencil and paint only, no "stick-ons" will be allowed.

D. The piping of each system shall be identified in the following locations and where directed by the Architect.

1. Pipe mains and branches - every 15´-0".
2. At each valve.
3. Each wall penetration (both sides).
4. Each riser including branch risers from mains.
5. At each piece of equipment.

E. The identification of piping shall be coordinated with the Owner and comply with OSHA and ANSI A13.1-1981 Standards for the identification of systems. Obtain approval of Architect prior to installation. The letter size and background color shall conform to the ANSI Scheme for the Identification of Piping Systems.

1.22 VALVE TAGS, NAMEPLATES AND CHARTS

A. All valves on pipes of every description shall be provided with neat circular brass valve tags of at least 1 1/2" in diameter, attached with brass hook to each valve stem or handle as determined by Architect. Tags shall be provided by the Plumbing Subcontractor for the work under his charge. Stamp on these valve tags, in letters as large as practical, the number of the valve and the service, such as "HW", "CW", for hot water and cold water. The numbers of each service shall be consecutive. Obtain approval of Engineer prior to installation.

B. All valves on equipment shall be numbered by 3" red metal discs with 2" high white numbers secured to stem of valves by means of brass hooks or small link brass chain.

C. These numbers shall correspond to numbers indicated for valves on the Record Drawings and on (2) printed detailed lists. These printed lists shall state the numbers and locations of each valve and the equipment or system which it controls and other necessary information such as requiring the opening or closing of another valve or valves when any one valve is to be opened and closed.

D. These printed lists shall be prepared in form to meet approval of the Architect and shall be framed under glass. Provide valve lists in booklet form also and submit (5) copies to the Architect.

E. Nameplates, catalog numbers and rating identification shall be securely attached to mechanical equipment with screws or rivets. Adhesives or cements will not be permitted.

F. The Plumbing contractor shall provide for his work all valve charts including his name and telephone number; date of chart; name and telephone number of Architectural Firm and Consulting Mechanical Engineering Firm and the Owner's representative.

1.23 PARTS LIST AND INSTRUCTIONS FOR OPERATION AND MAINTENANCE

A. The Plumbing contractor shall thoroughly instruct the Owner's operating personnel, to the complete satisfaction of the Architect, in the proper operation of all systems and equipment provided by him. The Plumbing Subcontractor shall make arrangements, via the Other Work Contractor, as to whom the instructions are to be given in the operation of the basic and auxiliary systems and the periods of time in which they are to be given. The Architect and Owner shall be completely satisfied that the Owner's representative has been thoroughly and completely instructed in the proper operation of all systems and equipment before final payment is made. If the Architect determines that complete and thorough instructions have not been given by the Plumbing contractor to the Owner's representative, then the Plumbing contractor shall be directed by the Architect to provide whatever instructions are necessary until the intent of this paragraph of the specification has been complied with. All time required for Owner's instruction to satisfy the above requirements shall be included in this Contract. No extra compensation for such instructions will be allowed.

B. The Plumbing contractor shall submit to the Architect for approval, a total of (5) typed sets, bound neatly in 3-ring loose-leaf binders, of all instructions for the installation, operation, care and maintenance of all equipment and systems. Information shall indicate possible problems with equipment and suggested corrective action. The manuals shall be indexed for each type of equipment. Each section such as valves, water heaters, sewage ejector, etc., shall be clearly divided from the other sections. A sub-index for each section shall also

be provided. The methodology of setting-up the manuals shall be submitted to the Architect and Owner through the Contractor for approval prior to final submission of manuals.

1.24 CONNECTIONS TO EQUIPMENT

A. The Plumbing contractor shall provide all pipe connections to equipment provided under other Sections of the specifications as shown on the Architectural and/or plumbing drawings and herein specified, (kitchen equipment and beauty salon), including final connections to equipment, to result in a complete system, fully operational. The Plumbing contractor shall also make connections to Owner furnished or relocated equipment as specified above. Coordinate location of all equipment with Architect and Other Work Contractor. Obtain installation diagrams and methods of installation of all equipment, from manufacturers. Follow instructions strictly. If additional information is required, obtain same from Architect.

1.25 COORDINATION DRAWINGS

A. Before materials are purchased, fabricated or work is begun, each Contractor shall prepare and obtain approval of coordination drawings and sections for all floors/areas, including buried system/services, resulting in (1) set of all-Trade-composite at 3/8" scale drawings, showing the size and location of all equipment, in the manner described herein under General Requirements. Architect and Owner's approval of coordination drawings must be obtained prior to any fabrication or installation of any equipment or systems.

B. The coordination drawings shall be generated from a computer CAD program compatible with AutoCAD Release 2007 in (DWG or DXF) format as a minimum. The HVAC contractor shall take the lead, supervise, and coordinate production of coordinated layout drawings, to show and coordinate all ductwork, piping, etc., and circulate the drawings to any of his contractors and the other Trades (Plumbing, Electrical), so that they can indicate all their work as directed by the other work Contractor and Architect and as required, to result in a fully coordinated installation.

C. The Plumbing and Electrical contractors shall issue to the HVAC Subcontractor, via diskette, a complete set of equipment installation layout documents in AutoCAD (DWG or DXF) format, for use in developing the required coordination and as built CAD documents.

D. The HVAC contractor shall be responsible for coordinating the AutoCAD coordination and as built drawings, including, but not limited to, the drawing lists, layering system, producing copies of the drawings for the Architect/Owner as directed, etc.

E. All costs associated with all aspects of coordination drawings, regardless as to how long they take to produce and how many times they have to be redrawn, shall be borne by the Plumbing contractor.

1.26 RECORD DRAWINGS

A. The Plumbing contractor shall maintain current at the site a set of his drawings on which he shall accurately show the actual installation of all work provided under his Contract indicating any variation from the Contract Drawings, in accordance with the General Conditions and Supplementary General Conditions. Changes whether resulting from formal change orders or other instructions issued by the Architect shall be recorded. Include changes in sizes, location and dimensions of piping, equipment, etc.

B. Utilizing the coordination drawings described herein before, the Plumbing contractor shall modify/correct/edit the plumbing work on the above CAD coordination drawings, to obtain a "CAD" set of Record Drawings.

C. A marked-up and colored-up set of prints on-site will be used as a guide for determining the progress of the work installed. They shall be inspected periodically by the Architect and Owner's representatives and they shall be corrected if found either inaccurate or incomplete. This procedure is mandatory.

D. Coordination drawings are for the Contractor's, Architect's and Owner's use during construction and shall not be construed as replacing any shop drawings. The CAD coordination drawings, when corrected for actual "as-built" conditions, will be reviewed by the Architect, corrected and will be used to formulate the Record Drawings to be submitted to the Owner for his use.

E. The Plumbing contractor shall submit a set of CAD files on disc marked "AS-BUILTS". All costs associated with the production and reproduction of the CAD files shall be included under the plumbing bid for work under the plumbing contracts.

1.27 HOISTING EQUIPMENT AND MACHINERY

A. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the work under this Contract shall be furnished, installed, operated and maintained in safe condition by the Plumbing contractor for his material and/or equipment delivered to the designated hoisting area. All costs for hoisting operating services shall be borne by the Plumbing contractor, for all equipment and work under his charge.

1.28 STAGING

A. All staging, exterior and interior for Plumbing work shall be furnished and erected by the Plumbing contractor and maintained in safe condition by him for proper execution of his work.

1.29 SUBMITTALS

A. Prepare and submit 6 sets of shop drawings in accordance with the requirements hereinbefore specified, and of Division 0 and applicable parts of Division 1 and in the manner described therein, modified as noted hereinafter.

B. All shop drawings shall have clearly marked the appropriate specification number, drawing designation, project name, etc., for identification of the submittal.

C. Disposition of shop drawings shall not relieve the Plumbing contractor from the responsibility for deviations from the drawings or specifications, unless he has submitted in writing a letter itemizing or calling attention to such deviations at time of submission and secured written approval from the Architect, nor shall such disposition of shop drawings relieve the Plumbing Subcontractor from responsibility for error in shop drawings or schedules.

D. Shop drawing data shall include, but not be limited to, the following:

1. Manufacturer's model and catalog data.
2. Complete connection diagrams for all Trades.
3. Dimensions, capacities, ratings, materials, finishes, etc.

E. Each shop drawing is required to bear the review stamp of each Contractor associated with installing the equipment and/or processing the document.

F. Shop drawings shall include, but shall not be limited to, the following:

1. Plumbing work layout, including location and sizes of piping, valves, drains, and all other accessories.
2. Equipment Cuts For:

    1. Valves, gauges, drains, piping, fixtures, trim.
    2. Hangers, supports, insulation and identification.
    3. Access panels.
    4. Floor drains

1.30 CORE DRILLING

A. This contractor shall perform all core drilling required for the proper installation of the plumbing system. Locate all required openings and prior to coring coordinate the opening with the General Contractor. Thoroughly investigate the existing conditions in the vicinity of the required opening prior to cutting. Care must be taken so as not to disturb the existing systems.

B. Locate all other openings required for the General Contractor. All cored openings are to be by Plumbing Contractor and all other openings are by the General Contractor. Patching of existing walls and openings shall be performed by the respective trade responsible for the finish material in which the opening is made.

C. All core drilling locations must be approved by the Owner.

PART 2 - PRODUCTS

2.01 HANGERS AND SUPPORTS

A. All piping shall be supported from the building structure by means of approved hangers and supports. Piping shall be supported to maintain required grading and sloping of lines, to prevent vibration and to secure piping in place, and shall be so arranged as to provide for expansion and contraction. In corridors, pipe hanging assemblies shall be furnished and installed by the other work Contractor. Sub trades to install their piping on these assemblies.

B. Maximum spacing of hangers on runs of steel, copper or brass piping shall be as follows:

Schedule - Hanger Spacing in Feet/Pipe Material

Pipe Size (inches)	Steel	Copper or Brass
½	7	5
¾	7	5
1	7	5
1¼	10	6
1½	10	8
2	10	8
2½	12	10
3	12	10
4	12	10

C. Maximum spacing on cast iron soil pipe shall be 5' and hangers shall be provided at all changes in direction. Hanger rods to support piping from the structure or supplementary steel shall not exceed 4' in total length. Where pipe support assemblies exceed 4' in total length, this Subcontractor shall furnish and install factory fabricated channels and associated accessories.

D. Where codes having jurisdiction require closer spacing, the hanger spacing shall be as required by code in lieu of the distances specified herein.

E. Hangers in general for all horizontal cast iron piping shall be clevis type hangers. These hangers shall be sized to provide for insulation protectors as hereinbefore specified.

F. Hangers for uncovered (un-insulated) copper and brass piping shall be factory applied plastic coated steel band.

G. Where three or more pipes are running parallel to each other, factory fabricated gang type hangers with the pipe saddle clips or rollers shall be used in lieu of the hereinbefore specified clevis hangers. These hangers shall be sized to provide for insulation protectors as hereinafter specified. Pipe saddle clips shall be not less than 16-gauge metal and shall be plastic coated when installed with un-insulated copper piping or plastic piping. All piping to be supported from Unistrut type hanger.

H. All vertical drops and runouts, including insulated pipes, shall be supported by extension type split ring type hangers. These hangers shall be plastic coated when used on uncovered copper tubing or plastic piping. Supports on insulated piping shall be sized to fit the outside diameter of the pipe insulation.

I. Field painting or spraying of hangers in lieu of plastic coating will not be accepted.

J. All hangers on insulated lines shall be sized to fit the outside diameter of the pipe insulation. Provide pipe covering protection saddles at all hangers on the insulated lines.

K. Remove rust from all ferrous hanger equipment (hangers, rods and bolts) and apply one coat of zinc rich coating immediately after erection.

L. Piping at all equipment and control valves shall be supported to prevent strains or distortions in the connected equipment and control valves. Piping at equipment shall be supported to allow for removal of equipment, valves, and accessories with a minimum of dismantling and without requiring additional support after these items are removed.

M. All piping installed under this SECTION of the Specification shall be independently supported from the building structure and not from the piping, ductwork, or conduit of other trades. All supplementary steel, including factory fabricated channels, required to meet the requirements specified herein, shall be furnished and installed by this Subcontractor.

N. All hangers shall be secured to approved inserts or expansion shields wherever possible and practicable. Drilling where required shall be done by this Subcontractor under this SECTION of the Specifications. The use of explosives for driving shields and inserts is prohibited.

2.02 INTERIOR VALVES, FLANGES AND UNIONS

A. General: All systems under this Section shall be provided with valves to permit complete and/or sectional control of the system. They shall be located to permit easy operation, replacement and repair. They shall be installed where shown on the drawings, or as herein specified. They shall be the product of one manufacturer and shall be as manufactured by one of the following companies: Apollo, or Watts.

B. Water Valves

1. Water valves 2" and smaller shall be all bronze ball valves Apollo Series B-6800 with four bolt design, full port teflon seated ball and three piece valve body designed for 250 psi water.
2. Drain valves shall consist of hose end drain valves, or ball valve with hose end adaptor, with bronze cap and chain.
3. Check valves shall be class 125 bronze bodied valves with bronze disc threaded cap, threaded ends by flanged ends where required by size.
4. Provide reduced pressure backflow preventors as shown on the drawings, complete with control valves, repair kit, test kits, pressure gauges and air gap fittings, with drains piped to nearest floor drain. Valves shall be mounted 4'-0" centerline above the floor and properly secured to the wall or floor stand mounted. Devices shall be tested and certified under AWWA Std. No. C506 and FCCCHR of USC manual, Section 10.

1. Backflow preventor on main domestic water service shall be WATTS 909 series or FEBCO Mfg reduced pressure zone device with FDA approved epoxy coated cast iron check valve bodies with bronze seats, FDA approved epoxy coated cast iron relief valve with stainless steel trim, bronze body ball

valve test cocks, outside screw and yoke gate valves with resilient wedges and 909AG-K air gap fitting.

a. Plumbing Equipment – 909-QT
b. Hot water application – 909-HW-QT

5. In-line vacuum breakers for continuous pressure shall be Watts model N9C or approved equal, with bronze body, stainless steel working parts, rubber diaphragm and disc, 3/8" female inlet and outlet connections for in-line continuous pressure applications, polished chrome plated.
6. Backflow preventors with intermediate atmospheric vent shall be Watts 9D or approved equal all bronze construction with stainless steel internal parts, threaded union connections and built-in strainer, to be used for ice-maker connections and locations as called for on drawings.

C. Hose bibbs where indicated shall be chrome plated, hose and faucet valves with vacuum breakers, Zurn-Z 875L7, or approved equal.

D. Trap primers for floor drains 2", 3" and 4" shall be Sure Seal System. Refer to manufacturers requirements for installation. Contact vendor at K.Ross Company 1-781-422-2273

E. Flanges shall be companion type, faced and drilled for not less than 125# steam working pressure except flanges on portions of the water service that are subjected to pressures above 125# shall be 250# rated, and all shall be complete with necessary adapter, and shall be of size and material of adjacent piping.

F. Unions shall be suitable for working pressure of not less than 250 psi and shall be of size and material of adjacent piping. All threads shall be IPS to match connections

G. Water pressure reducing valves shall be Watts all bronze with diaphragm protector – see schedule on drawings.

H. Natural gas shutoff valves 2" and smaller shall be Eclipse bronze ball valve, 150 psig maximum working pressure. Over 2" size natural gas shutoff valves shall be Eclipse lubricated plug cocks, 175 psig maximum working pressure. Check valves on natural gas piping shall be Jamesbury disc type check valves, brass body, screwed ends, aluminum soft seated disc.

2.03 ACCESS PANELS

A. Group together valves, cleanouts, etc., concealed in suspended ceilings, walls and furred spaces to reduce the number of access panels, but all valves must be freely accessible for maintenance. Locate valves within unit walls where possible.

B. Furnish access panels of proper size to service concealed valves and other items, but in no case less than 24" x 24". Panels shall be of the proper type for material in which they occur to be furnished by this contractor. Panels to be installed by the trade subcontractor in whose work the panels occur.

C. Panels shall have flush doors with #14 USCG steel door and trim #USCG steel frame, metal wings for fitting into construction, concealed hinges and screwdriver operated stainless steel cam lock. Panels shall be shop coated with two coats of zinc chromate primer.

D. Provide an access panel at all domestic water shut off valves. Prior to the start of work coordinate exact panel locations with Architect and Construction Manager.

E. Access panels to be Acudor-mfg-5000 series.

2.04 PIPE MATERIALS

A. Cast Iron Soil Pipe and Fittings - Above ground soil, waste and vent piping

1. American manufacture no-hub cast iron soil pipe and fittings conforming to ASTM A74. Joints to be made with couplings consisting of stainless steel shield and clamp assembly and elastomeric sealing sleeve. Clamps shall be heavy duty Clamp-All or Anaco Husky SD-400.

B. Cast Iron Soil Pipe and Fittings - Buried soil, conductor, waste, and vent piping

1. American manufacture service weight cast iron soil pipe and fittings conforming to ASTM A74. Joints shall be made with rubber resilient gasket push-on joints.

C. Copper Tubing and Fittings (Type L) - Water Piping

1. Tubing to be Type L hard temper conforming to ASTM Specification No. B88-78. Fittings to be wrought copper conforming to ASTM B16.22. All joints shall be soldered with ASME Standard BWS/A5.8 lead free solder. Shall be used for all interior water piping.
2. May be used above ground for soil, waste and vent piping.

D. Natural Gas

1. Black steel pipe shall be Schedule 40 conforming to ASTM Designation A53 (seamless type). Fittings shall be black malleable (threaded or flanged) 150 pounds, conforming to ASA Designation B16.3. Shall be used for interior gas. Gas pipe dropping in concrete block walls shall be factory wrapped with corrosion resistant covering No. X-TRU coat or scotch kote.
2. All gas piping 3" and over shall be joined by welded connections, except where detailed otherwise.

E. Schedule 40 PVC (Cosmetology Lab)

1. Provide schedule 40 PVC piping and drainage fittings for use with the shampoo sinks. All associated waste and vent piping above and below grade to be PVC.

2.05 DRAINAGE SPECIALTIES

A. **Before setting any drains, carriers, cleanouts or wall plates, obtain from the other work contractor the exact** information relative to the finished grades of the top of the drains and partition locations. All drainage specialties shall be of the size noted on the drawings and shall be equal to the figure numbers scheduled below. Figure numbers are Zurn Company. Drainage specialties shall be Zurn.

B. Lavatory Carriers

1. Lavatories slab type - shall be supported on Zurn Z1231 concealed arm system with chrome plated threaded escutcheons and block base foot supports.
2. NOTE: All carrier foot supports shall be lagged to the floor slab.

C. Floor Cleanouts

1. Floor cleanouts shall consist of dura-coated cast iron body, inside caulk outlet, tapered threaded plug, adjustable nickel bronze top, Zurn or approved equal.
2. For concrete floor - Zurn ZN1400
3. For vinyl composite tile - Zurn ZN1400-X
4. For carpeted areas - ZN1400-CM.
5. For heavy traffic unfinished areas Zurn Z-1400 with cast iron top.

D. Wall Cleanouts

1. Zurn Model ZS1469 cast iron supreme cleanout tee with tapered threaded plug, round stainless steel access cover with securing screw.

E. Floor Drains (FD)

1. SEE DRAWINGS FOR LOCATIONS AND SCHEDULE

2.06 WATER HAMMER SHOCK ABSORBERS

A. Zurn-1700 Series or approved equal - stainless steel "shoktrols" shall be installed on water supply lines to plumbing connected equipment equipped with fast acting valves, such as dishwashers, clothes washers, and showers, and the like to control water hammer. They shall be sized and selected in accordance with PDI Standard WH201 with access through approved access panels.

2.07 INSULATION

A. All piping and equipment installed under this Contract shall be covered as follows:

1. All domestic and non domestic cold water.
2. All domestic and non domestic hot water
3. All tempered water piping.

B. Materials: The following materials are specified:

1. Water piping insulation - fiberglass.
2. Fittings and Valve Insulation:

    1. Hydraulic setting combination insulating and finishing cement.
    2. Molded or fabricated fitting covers of equal thickness and identical in composition to adjacent pipe insulation.

3. All materials, including vapor barrier jacket, glass cloth jackets, adhesives, etc., shall be fire retardant.
4. All piping in shower/locked room to be provided with PVC jacket that is vapor/mildew resistant

C. Insulation Thickness: The piping, fittings, and valves shall be insulated with the following minimum thicknesses:

1. Domestic hot water and tempered piping, 3/4" thick up to 1" pipe size; over 1" pipe size shall be 1" thickness.

2. Cold water piping shall be 1/2" thick.

D. Finish:

1. Concealed Piping: Vapor barrier jacket on all cold water piping. Pre-sized glass cloth jacket may be used on hot water piping. Fittings shall be finished with pre-sized glass cloth jacket, PVC coverings, or fire retardant cloth.
2. Exposed Piping: Same as concealed, except all insulation shall have factory applied pre-sized glass cloth jacket, or all service jacket.

E. Application

1. General:

1. All insulation shall be installed in strict accordance with the manufacturer's recommendations and shall be applied by a qualified insulation contractor.
2. Coverings shall not be applied on any apparatus or piping until the apparatus and piping have been thoroughly cleaned, tested, and accepted as tight.

2. Piping: Pipe insulation shall be installed with vapor barrier jackets drawn tight and firmly sealed to assure a positive vapor seal. End joints shall be covered with 4 inch wide butt strips of material identical to vapor barrier jackets, and they shall be drawn tight and securely sealed. The use of staples, bands, etc., to secure insulation will not be accepted.
3. Fittings and Valves:

1. Cement or molded insulation on fittings and valve bodies shall be same thickness as adjacent covering and finish neatly to match the adjacent pipe insulation.

2.08 FIXTURES, EQUIPMENT, SUPPORTS, AND FASTENERS

A. All fixtures and equipment shall be supported and fastened in a satisfactory manner. Where fixtures are secured to masonry walls or partitions, they shall be fastened with 1/4" through bolts provided with nuts and washers at back. Bolt heads and nuts shall be hexagon, and exposed bolts, nuts, washers, and screws shall be chromium plated brass.

B. Where secured to concrete or brickwork walls, they shall be fastened with brass bolts or machine screws in lead sleeve type expansion shields and shall extend at least 3 inches into solid concrete brickwork.

C. Fixtures shall be as shown on fixture schedule or approved equal in every respect in the opinion of the Architect and the Owner and shall be installed complete with all trimmings and fittings. Refer to architectural drawings for exact number, location and orientation of fixtures. Color of all fixtures to be selected by the Architect and verified with the Owner prior to purchasing.

D. ADA compliance of all fixture installations shall be coordinated with the architect prior to purchase of fixtures and prior to the start of work.

E. Refer to the fixture schedule on the drawings for all fixture specifications.

2.09 GAS DETECTION SYSTEM

1. The gas detection system(s) shall be as indicated on the project documents, point list, drawings and as described in these specifications. This scope of work shall include a complete and working system including all engineering, programming, controls, and installation materials, commissioning, start-up, training, and final project documentation and warranty.

B. VA301C CONTROLLER

1. The control panel must be capable of communicating digitally with the networked transmitters and relay modules through three RS-485 Modbus communication buses. Each communication bus must be capable of accepting a combination of up to 32 addressable transmitters, relay modules, or annunciator panels at a maximum distance of 2,000 feet (609 m).
2. The control panel will manage four internal DPDT relays at fully programmable alarm levels (and within programmable time delays). The relay rating will be not less than 5 A, 30 Vdc or 250 Vac (resistive load).
3. The control panel must include a (operator initiated) self-test function that allows for the activation/deactivation of all the programmed outputs by simulating a continuous 5% increase/decrease value until the maximum/minimum value is reached.
4. The control panel must include a real-time clock that enables operation of the outputs for a specific time frame.
5. The control panel must also include a Honeywell energy saving feature that allows for output operation on alarms set at the max, min, or average value of a specific group of transmitters. This feature must also allow for the activation of outputs upon a certain number of a specific group (¾, ½, ⅓ and ¼) of transmitters reaching their alarm levels. 128 groups can be assigned.
6. The control panel will indicate the exact concentration of gas, the gas detected, and the location of the sensor by scanning through the network and displaying the detected levels at each point on an LCD display.
7. The LCD display will indicate multiple alarm levels for each sensing point. The LED will also provide visual feedback in the following manner:

Normal Operation:	Green LED
Alarm Level A:	Red LED
Alarm Level B:	Red LED
Alarm Level C:	Red LED
Failure:	Yellow LED
TX:	Yellow LED
RX:	Green LED

8. The standard three high/low alarm levels will be complemented with multiple levels that can be field programmed.
9. The panel will have an audible alarm incorporated (rated at not less than 65 dBA at three feet), which will be activated at fully programmable levels.
10. The control panel will leave the factory fully programmed and will be adjustable in the field by keying in instructions via the keypad (password protected). Programming may be saved on an optional SD Flash memory card.
11. The control panel shall enable BACnet communication through its BACnet output using BACnet/IP protocol over twisted-pair Ethernet (10 BaseT) cable RJ45.

12. The unit will be certified to UL and CSA standards. The controller must be manufactured within an ISO 9001 production environment. The sensors and controller must be FCC

C. DETECTORS E3Point: Model E3SMSCO (CO) & E3SM-E3M (CH4)

1. Transmitter will be powered by the control panel power supply rated at 24 Vac. Fully addressable gas transmitter must be capable of communicating digitally with controller through an RS-485 communication port. Gas transmitters must be installed in a true daisy chain with an end of the line resistor on the last transmitter. The gas transmitter will incorporate an electrochemical cell for toxic gas monitoring and catalytic bead sensor for combustible gases. Unit sensing cell must compensate for variations in relative humidity and temperature to maintain high levels of accuracy.
2. When placed in a network configuration the transmitter will be capable of transmitting gas concentrations through the controller. For local activation of fans or louvers (or other equipment) an on-board DPDT relay 5 A, 30 Vdc or 250 Vac (resistive load) will be activated at programmable set points (and programmable time delays) through the control panel. An LCD display will provide gas concentration readings.
3. Transmitter will be capable of operating within relative humidity ranges of 5-95% and temperature ranges of -4° F to 104° F (-20° C to 40° C).
4. Unit will be certified to ANSI/UL 61010-1 label and CAN/CSA-C22.2 No. 61010-1. Transmitter must be manufactured in an ISO 9001-2000 production environment.
5. The transmitter should have a plug-in capability for a gas cartridge with a smart sensor capable of self-testing.
6. For local activation of audible alarms, the transmitter shall have an on-board device able to generate an audible output of 85 dBA @ 10 ft (3 m).

Toxic gases	First Alarm Set point (TLV-TWA)	Second Alarm Set point (TLV-STEL)	Third Alarm Set point (TLV-STEL)	Sensor Location	Radius of Coverage
Carbon Monoxide (CO)	150 PPM	200 PPM	225 PPM	5 ft Above floor	20 feet

Combustible Gases	First Alarm Set point	Second Alarm Set point	Third Alarm Set point	Sensor Location	Radius of Coverage
Methane (CH4)	40 % LEL	50 % LEL	90%	1 ft Below ceiling	20 feet

D. ACCESSORIES

1. Provide a power transformer type T200VA to power system. Transformer shall have an input voltage of 120 V AC and an output voltage of 24 V AC with a VA range of 50-300. Operating frequency shall be 60 Hz. Unit will provide insulation systems up to 130° C (50-1300 VA). Unit will operate at sound levels of less than 40 db.

E. EXECUTION DETECTION SYSTEM

1. Carbon monoxide and combustible gas detection system shall include maintenance-free, Electrochemical, detectors located strategically throughout the structure. Each detector shall cover a maximum area of 1,300 sq feet (120 sq meters).
2. The carbon monoxide and combustible gas detection system shall be provided to monitor the levels in the structure and control the exhaust fan and gas valve to the kitchen hood.

F. INSTALLATION

1. The system shall be installed with strict adherence to the manufacturer's guide lines.
2. Mount carbon monoxide sensors where indicated on Drawings, 3-5 feet above finished floor.
3. Mount methane sensors where indicated on Drawings, 1 foot below finished ceiling.
4. Interfacing equipment is specified in other sections.
5. Install low-voltage conduit and wire for fan activation run from relay onboard local methane sensor, also for gas valve shutdown run from relay onboard local carbon monoxide sensor and from controller to the BAS and the FA.
6. Line voltage conduit and wire are specified in Division 16: Electrical.

G. SEQUENCE OF OPERATION

1. System consists of A VA301C Controller, (6) CO, (6) Methane, and (1)T200VA Transformer to serve six kitchen hoods. Each hood will be considered a zone and the activation of fan or closure of gas valve shall be independent for each hood.
2. Normal Condition

    1. CO/CH4 control monitor powered up in failsafe mode.
    2. Hood Fan is energized through BAS. (Fan is off at night)
    3. Gas Solenoid valve is open & gas is flowing

3. 1ST Level Alarm Condition

    1. E3 CO sensor or E3 CH4 (methane) sensor goes into alarm based on reset limits (150ppm CO, 40% LEL CH4)
    2. If hood fan is off then relay onboard methane sensor shall close to energize fan
    3. Output relay in VA301C controller is closed to notify BAS

4. 2nd Level Alarm Condition

    1. E3 CO sensor or E3 CH4 (methane) sensor goes into 2nd alarm based on preset limits (200 ppm CO, 50% LEL CH4)
    2. Relay onboard CO sensor opens and shuts gas valve
    3. Output relay in VA301C controller is closed to notify BAS

5. 3rd Level Alarm Condition

    1. E3 CO sensor or E3 CH4 (methane) sensor goes into 3rd alarm based on preset limits (225 ppm CO, 90% LEL CH4)
    2. Output relay in VA301C controller is closed to notify BAS

6. Loss of Power

    1. If Gas Monitoring System losses power, failsafe relay closes serving the gas valve and opens serving the Hood Fan.

2. Relay onboard CO sensor is opens closing Gas Solenoid valve & gas flow is halted, Relay onboard CH4 sensor shall close to confirm Hood Fan is energized.
3. Output relay in VA301C controller is closed to notify BAS

7. Sensor Failure/Fault

1. E3CO or E3CH4 sensor goes into communication failure alarm.
2. Relay onboard methane sensor closes to energize hood fan.
3. Relay onboard CO sensor Gas Solenoid valve opens & gas flow is halted
4. Output relay in VA301C controller is closed to notify BAS

H. COMMISSIONING

1. After installation, test and calibrate equipment to demonstrate operation of functions described above under sequence of operation by manufactures certified service technician

I. WARRANTY.

1. Limited Warranty

1. Honeywell Analytics, Inc. warrants to the original purchaser and/or ultimate customer ("Purchaser") of Vulcain products ("Product") that if any part thereof proves to be defective in material or workmanship within twelve (12) months, such defective part will be repaired or replaced, free of charge, at Honeywell Analytics' discretion if shipped prepaid to Honeywell Analytics at 4005 Matte Blvd., Unit G, Brossard, Quebec, Canada, J4Y 2P4, in a package equal to or in the original container. The Product will be returned freight prepaid and repaired or replaced if it is determined by Honeywell Analytics that the part failed due to defective materials or workmanship. The repair or replacement of any such defective part shall be Honeywell Analytics' sole and exclusive responsibility and liability under this limited warranty.

PART 3 - EXECUTION

3.01 TESTING OF PIPING SYSTEMS

A. General

1. All piping systems shall be subjected to testing with water, gas or air as noted and shall hold tight at the pressure head stated for the time interval required without adding air or water. While any system is being tested, required head or pressure shall be maintained until all joints are inspected.
2. All tests shall be witnessed by the inspector having jurisdiction and the Architect/Engineer, or Owner's representative, with 48-hour notice given these authorities.
3. All equipment, material and labor required for testing any of the various systems or any part thereof shall be furnished by this Plumbing Subcontractor.

B. Sanitary, Waste, Kitchen Waste and Vent Drainage Systems: Water test shall be applied to these drainage systems either in their entirety or in sections as required, after rough piping has been installed. If applied to the entire system, all openings in the piping system shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly closed except the highest opening in the section under test, and each section shall be filled with water but no section shall be tested with less than a 10' head of water. In testing successive sections at least the upper 10' of the next preceding section shall be tested so that no joint of piping in the building, except the uppermost 10' of the system, shall be submitted to a test of less than a 10' head of water. The water shall be kept in the system for at least 15 minutes before inspection starts; the system shall then be made tight at all points.

C. Any points of the drainage systems to be tested with air (vent system) instead of water shall be made by attaching an air compressor testing apparatus to any suitable opening and after closing all other inlets or outlets, forcing air into the systems until there is a uniform gage pressure of 5 psi or sufficient to balance a column of mercury 10" high. This pressure shall be held without the introduction of additional air for a period of at least 15 minutes.

D. Interior Water Piping Systems (Domestic): Upon completion of all water supply systems or a section of them as required, they shall be tested and proved tight under a water pressure of 175 psi. Gage should be located on the lowest floor and pressure shall hold for a period of one hour without introducing additional water. The water used for testing shall be from a potable domestic water source of supply.

E. Natural Gas Piping - 6" column of mercury for one hour.

3.02 SOIL, WASTE, KITCHEN WASTE and VENT PIPING

A. Pipes shall be plumb and parallel to building walls, beams, and columns. All horizontal lines are to be evenly pitched and properly secured with iron or steel hangers. A pitch of 1/4" per lineal foot shall be maintained on all soil, waste, and conductor lines, wherever possible. Where long runs of piping require less pitch due to space restrictions, a less pitch shall be allowed on main lines 4" and over in size, but in no event should any pipeline have a slope less than 1/8" per lineal foot.

B. All soil and waste pipes shall be carried out full size through the roof or connected to a common vent above the fixture and as shown on the drawings.

C. The main stacks of back ventilation shall run parallel and as close as possible to the soil pipe stacks and shall connect to the vent continuation of the soil stack at least 3" above the rim of the highest plumbing fixtures on the stack; vent stacks shall also be dripped into the bottom of the soil stack through a Y and 1/8 bend on an upright Y fitting. Offsets in vent pipe shall be made with 45 degree fittings wherever possible. Horizontal vent lines shall pitch toward a waste line.

D. Threaded joints shall have American National taper screw thread with graphite and oil compound applied to the male threads.

E. Piping to be run straight and plumb and all offsets shall be made at an angle of not less than 45 degrees and all threaded joints shall be as specified above.

F. Carefully lay out the work in advance so that the pipes will pass through the opening and permit the proper pitch to the pipelines. Due to the extensive system of ventilation and lighting systems, it will be necessary for all trades to properly coordinate their work with the work of other trades so as to avoid the necessity of taking down work installed without prior checking.

3.03 CLEANOUTS

A. Provide and connect cleanouts with brass caps and screws same size as pipe up to 4" and not less than 4" for larger piping at the ends of all branches on soil and waste piping, and in such other portions of the piping where run is over 50 feet. Under floor cleanouts shall be installed as detailed. Special attention is called to cleanouts in carpeted areas. Cleanouts shall have special carpet marker if carpet is installed.

B. Where stacks enter drains near walls or piers causing difficult access to end cleanouts, there shall be a vertical cleanout on the stack just above the floor with a 1/4 bend at the foot of the stack.

C. Where such conditions occur in walls or partitions, the cleanout cover shall be accessible through an opening left in the wall and covered with the flush chromium plated brass plate or access panel securely fastened in place.

D. Where test tees are installed at the base of the stack, or on the stack, they may be used as a cleanout.

E. Brass cleanouts shall be solid nut construction.

F. Provide the Owner with two wrenches for removing flush cleanout plugs.

3.04 INTERIOR WATER PIPING

A. Test all water piping.

B. Pipe used in piping assembly must be clean of dirt and obstructions and shall have ends square and reamed before butting into the fittings.

C. Cut the tube to the required length with hacksaw or tube cutter designed for copper work.

D. Remove burrs from the inside and outside of the cut edge and clean the end of the tube with steel wool or sand cloth until all discoloration is removed and metal is smooth and bright.

E. Oxides will be removed by sand cloth, brush, etc.

F. Removal of oxides or discoloration of pipe and fittings by acids or self-cleaning flux is forbidden.

G. Apply a thin, uniform and complete coating of reliable brand of soldering flux meeting the ASME Standard BWS/A5.8, lead free to the cleaned surfaces of the tube and fittings.

H. When joints are soldered, remove excess solder with a cloth or brush leaving a fillet of solder in the chamber at the end of the fitting.

I. All piping must be true and plumb and with proper pitch for draining after soldering.

J. All lines of water piping shall be protected from water hammer by shock absorbers. Where shock absorbers (or shocks) are used, they shall be as manufactured by JR Smith, or Zurn Mfg. Co., shall conform to the Plumbing and Drainage Institute published requirements and shall be made accessible through access panels.

3.05 DISINFECTION OF ALL WATER SYSTEMS

A. General

1. All water piping systems, including services out to point of connection with mains outside building, shall be thoroughly disinfected with a solution containing not less than 50 parts per million of available chlorine by this Subcontractor. The chlorinating material shall be either liquid chlorine or sodium hypochlorite solution.
2. This work is to be supervised by the Owner's representative and performed by an Owner approved chemical testing laboratory and results sent to the Architect or his representative for verification. All costs shall be borne by this Subcontractor.
3. The testing laboratory shall submit a summary of the test procedure to the Owner for approval prior to any work being performed. All work to be in accordance with the Owner's requirements. This Subcontractor shall provide any and all valves, pipe and connections required to disinfect the water supply system totally or in part as required. Provide isolating valves and draw-off valves for proper containment, phasing and flushing.
4. All water piping systems shall all be disinfected.

B. Procedure

1. The water systems shall be tested and thoroughly flushed prior to chlorination.
2. The disinfection solution shall be introduced into the piping and allowed to remain in the system for a period of 24 hours, during which period all valves and faucets shall be opened and closed several times with the chlorine drawn to all points in the system. After disinfection, the solution shall be flushed from the system with potable water until the residual chlorine content is not greater than 0.2 parts per million. Prior to any further testing procedures, the Architect and the Owner shall review all draw-off valve locations and chlorine introduction locations. Submit plans indicating same for review.
3. This Subcontractor is to allow ample time for the chlorination of the water systems and is to plan the chlorination just prior to occupancy if possible. If the system is to sit dormant for any extended period of time prior to occupancy, this Subcontractor is to flow water from all points in the building to completely flush the systems prior to

occupancy. A full three days notice will be given the Owner and Architect prior to the start of disinfection.

C. Tests

1. The Owner's representative shall select two locations on each floor of the building for a chlorine concentration test. The Owner's representative shall select three locations on each floor for a chlorine residual, a coli form bacteria and total plate count bacteria tests. The laboratory report shall include sample locations, chlorine concentration, chlorine residual, coli form bacteria count and, after flushing, total plate count bacteria tests.
2. Acceptable limits for total plate count shall be 300 per 100 ml sample. Acceptable levels of chlorine residual shall be .2 PPM.
3. If these parameters are not met, continued flushing of the water systems shall be required until they are met.
4. Full Owner acceptance of the water systems shall not be given until these parameters are met, documented and submitted by the Testing Laboratory selected.

3.06 PLUMBING and KITCHEN CONNECTED EQUIPMENT

A. Furnish and install waste and vents, traps, cold water, hot water piping and gas piping required including pipe stands, supports and hangers, as well as trim and all final connections to equipment and appliances provided under other sections. Roughing for this equipment shall be as indicated on the drawings.

B. Furnish and install shutoff valves at each piece of equipment. Obtain exact roughing in dimensions from manufacturers of all service locations before connecting to or roughing for equipment.

C. Furnish and install backflow preventers, pressure reducing valves and vacuum breakers as required.

D. Sinks and equipment connected to by this Contractor but furnished and set under another section of the Specification shall be identified on the plumbing documents.

3.07 NATURAL GAS SYSTEM

A. Connect to new service where indicated with an approved shutoff valve and extend to the required points throughout the building. Obtain permits and defray all costs incidental to the interior gas piping. Furnish and install all piping, stop valves and connections to all equipment and outlets requiring gas within the building.

B. A suitable drip or condensate pocket shall be installed at bottom of risers.

C. Gas piping and safety devices shall conform to the requirements of the NFPA Standard No. 54 and shall be subject to inspection and approval of the State Gas Regulatory Board.

D. Provide a gas cock valve at each branch runout from main or riser serving gas outlets.

E. All piping shall be securely fastened, separately hung and shall not support any other weight or piping. Piping dropping in concrete block walls shall be factory wrapped for corrosion protection.

F. Gas valves or cocks shall not be concealed and shall be readily accessible for inspection and repair. All welded piping shall conform to the latest requirements of the National Fuel Gas Code.

3.08 PLUMBING SYSTEMS ACCEPTANCE PROCEDURE

A. Performance Testing

1. The Plumbing contractor shall coordinate with other subcontractors, and work together to demonstrate each system completely to the Owner, proving that all systems work installed and comply with the design concept, shop drawing and sequence of control. The subcontractor shall submit, by system, a performance test method and format that indicates the system, the point descriptors for all systems, field values, BAS values, occurrence values, manual automatic controls, status values, etc., for approval.
2. The contractor shall assist and demonstrate, by witness tests, education programs, inspection, the functioning of the plumbing systems as part of the complete Building Acceptance Procedure. Refer of General Conditions for additional requirements.
3. A separate binder shall be maintained by the subcontractor containing, by system, all punch list items, performance test format and trend logs relative to testing.
4. The subcontractor shall notify the Owner in writing that each system is complete and ready for testing. If it is found that the systems are incomplete, the Plumbing Subcontractor shall reimburse the Owner for additional time, expenses and material required to complete testing of each system.
5. Upon completion of the performance test of each system, the Owner, in writing, shall submit his recommendation regarding acceptance so that beneficial use may be determined.

B. Owner's Acceptance of Test Procedure

1. Submittal data relevant to Performance Characteristics, functions, limits, sequences, interlocks, power fail-restart, and associated parameters and other pertinent information for the operation system and data base shall be forwarded from the Plumbing Subcontractor to the Owner's authorized representative and Engineer's representative.
2. Any deficiency identified during demonstration shall be noted as a punch list item, but progress of demonstration shall not be halted to correct the deficiencies.
3. Problems which occur within approved hardware or software shall be corrected in an appropriate fashion under guarantee. Any such occurrence shall not void previous approval; however, the Plumbing contractor shall be responsible to attend and to remedy such items within reasonable amount of time. Appropriate logs, schedules and reports shall be maintained to reflect these items and their redress.

3.09 SHUTDOWNS

A. This contractor shall work with the Owner in maintaining the plumbing integrity of the adjacent buildings. Coordinate and minimize any and all shutdowns of the fire protection system. Give proper notice to the Owner when making shutdowns, a minimum of two full days. Perform any duties required by the Owner when making a shutdown. A fire watch may be required during a shutdown. The duration of all shutdowns shall be kept to a minimum. In no case shall the plumbing system be shut down during the off hours of the work day without a fire watch. The system shall be returned to its normal operating condition at the end of each work day.

3.10 DEMOLITION

A. Disconnect and remove all existing plumbing fixtures and piping as shown.

B. Disconnected and removed fixtures and piping shall be removed off the site and disposed of legally by this contractor, except materials which must be retained by the Owner shall be turned over to the Owner. Neatly stockpile materials until material can be disposed of as required where directed.

C. All disconnected and removed piping shall be plugged or capped back at main or riser. All unused branch piping must be removed. Existing stacks and risers which are exposed due to wall demolition must also be removed.

END OF SECTION 15400

SECTION 15600
HEATING, VENTILATING AND AIR CONDITIONING

(Filed Sub-Bid Required)

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SECTION 15600

HEATING VENTILATING AND AIR CONDITIONING
(Filed Sub-Bid Required)

PART 1 - GENERAL

1.00 GENERAL REQUIREMENTS:

A. Examine the GENERAL CONDITIONS for additional requirements which will affect this Section whether or not specifically mentioned in this Section including Section 00100 - INSTRUCTION TO BIDDERS.

B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not specifically mentioned in this Section.

C. Coordinate work with trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.01 SUMMARY OF WORK

A. Project Identification: As follows:

1) Project: **WALTHAM HIGH SCHOOL**
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM

2) Owner: **Waltham School Department**
City of Waltham
617 Lexington Street
Waltham, MA 02452

B. Contract Documents, dated May 30, 2012, were prepared by JFF Design, Architects, 24 Warwick Avenue, Waltham, MA 02452, (781) 899-6908.

C. The Work consists of but not limited to the complete rehabilitation of three existing rooms within the existing Waltham High School and work to the extent and as delineated and as described in the Contract Documents. Work associated with the Filed Sub-Bid categories, Mechanical, Electrical and Plumbing, will be performed by those Sub-Bidders.

1. Chef's Kitchen:

a. Limited selective demolition occurs in the Chef's Kitchen including complete removal of existing VCT tile floor and preparation for new sheet linoleum flooring product.
b. Repair and patch of all walls from newly installed utilities and existing pock marks.
c. Installation of new ceiling systems as delineated on the Architectural Construction Documents.
d. Complete layout, procurement of equipment and rough and final connections of all kitchen equipment in accordance with the Construction Documents.

e. Installation of new lighting scheme, fixtures and other electrical / fire alarm and safety equipment in accordance with the Construction Documents.
f. All coring to be the responsibility of the associated Filed Sub-Bidder for whose trade the coring is required. They will equally be responsible for sealing all cores with appropriate fire rating material upon completion of their work.

2. Cosmetology Lab:

a. Limited selective demolition occurs in the Cosmetology Lab including but not limited to new saw-cut trenching, removal of concrete and installation of new packing material and concrete to match existing floor level for installation of new soil waste line for new sink units. This work to be performed by the Plumbing Filed Sub-Bidder.
b. The complete removal of existing VCT tile floor and preparation for new sheet linoleum flooring product.
c. Installation of new part-height wall as detailed in the Construction Documents for concealing new piping associated with new sink units.
d. Complete layout, procurement of equipment and rough and final connections of all cosmetology equipment in accordance with the Construction Documents.
e. Removal of existing 2 x 4 acoustical ceiling tiles, cleaning and painting of the existing grid and the installation of new light fixtures and acoustical ceiling tiles in accordance with the Construction Documents.
f. Painting of all new wall construction in accordance with the Construction Documents.

3. Title IX Locker Room:

a. Extensive selective demolition occurs in the Title IX Locker Room including complete removal of existing shower stalls, associative piping (to be removed by Plumbing Filed Sub-Bidder) and required concrete slabs and replacement for smooth floor transition and patching.
b. Painting of entire area of work for new wall and floor material in accordance with Construction Documents.
c. Procurement, preparation and installation of new lockers and benches.
d. Manufacturer and installation of metal security grates in accordance with Construction Documents.
e. Procurement and installation of new overhead projection device.
f. Attention to add alternative work as prescribed in the Alternates Section 01030 and in accordance with the Construction Documents.

4. Provide all demolition shown on the plans and as necessary to accomplish all the work of the contract. Please note that all the demolition and patching for the Mechanical, Electrical and Plumbing work shall be performed by the Mechanical, Electrical and Plumbing Filed Sub-Bidder.

5. Patching: The General Bidder shall own ALL patching to existing walls, floors and ceilings that are disturbed by any of the demolition activities outside of

the Filed Sub-Bid categories. Patching shall match existing adjacent materials and finish (including texture).

6. Filed Sub-Bid Demolition includes the demolition of any and all existing building materials, finishes, systems and/or equipment that is required to be removed in order to perform the work of the Filed Sub Bid, including disposal. Patching shall match existing adjacent materials and finish (including texture).

1.02 WORK RESTRICTIONS

1. Contractor's Use of Premises: During construction, Contractor shall have limited use of building as indicated. Contractor's use of premises is limited to the area of the work and access to the area of work.

2. Work to be performed around the normal school hours, summer school and weekend building use schedules. Work to be performed during school summer hours until August 28, 2012, Monday – Friday 7 AM – 5 PM, are assumed normal hours. Hours worked outside of this time frame are available to all Contactors and Sub-Contractors and additional cost will not be authorized nor considered. Contractor shall maintain a minimum of two paths of egress from all intersecting spaces and corridors. The actual paths of egress shall be coordinated in the field with the Architect and Director of Facilities prior to the commencement of work in any given area. The Contractor will coordinate these areas with the School Administration, Director of Facilities and Architect. If work continues beyond the start of school, August 29, 2012; the Contractor will coordinate working time with the Director of Facilities and Architect outside of normal school hours. Work continuing beyond August 29, 2012, with exception to holiday or school vacation time, will be allowed Monday – Friday from 2:15 PM – 11 PM, with both Saturday and Sunday available. The adjusted "school session" hours are considered normal work time with respect to the project and additional cost will not be authorized nor considered.

1.03 DESCRIPTION OF WORK

A. Work Included: For the specific areas noted below, provide all labor, materials and equipment necessary to complete the work of this Section as specified and as shown on the project plans.

1. For Chef Kitchen, provide a complete kitchen hood system with grease exhaust duct and fan and gas fired make-up air unit and supply ductwork including duct mounted, heating coils. Provide individual exhaust sysems for the dishwasher and remote convection oven. Rehabilitate the existing classroom unit ventilator as noted.

2. For Cosmetology, provide a new exhaust fan with controls and discharge duct to exterior. Existing classroom unit ventilator is to be re-used.

3. For Locker room, raise an existing return grille as shown on plumbing plan, P-1.01, as an Add Alternate.

B. Work Included: In general, provide all labor, materials and equipment necessary to complete the work of this Section as noted in the specifications and on the plans, including but not limited to the following:

1. Sleeves, inserts and hangers.
2. Equipment bases and supports.
3. Vibration isolators.
4. Motors.
5. Expansion joints.
6. Pressure gauges and thermometers.
7. Sheet metal work.
8. Complete air distribution system including ductwork, diffusers, registers, grilles, splitters, dampers, and similar items.
9. Insulation for duct, piping and equipment.
10. Exhaust fans.
11. Rooftop, gas fired, supply make-up air unit.
12. Hot water duct coils.
13. Pipe, duct, valve and equipment identification.
14. Instruction manuals and startup instructions.
15. Testing and balancing.
16. Cleaning.
17. Automatic temperature controls.
18. Core drilling for the Work of this Section.
19. Coordination drawings and record drawings and similar requirements.

C. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 051200 - STRUCTURAL STEEL FRAMING for structural supports necessary to distribute loading from equipment to roof or floor.
2. Section 078413 – PENETRATION FIRESTOPPING for coordination of floor and wall penetrations with firestopping contractor.
3. Section 092116 – GYPSUM BOARD ASSEMBLIES for coordination with gypsum ceilings.
4. Section 16000 - ELECTRICAL WORK for electrical power to mechanical equipment as indicated on the Drawings.

D. Perform work and provide material and equipment as shown on Drawings and as specified or indicated in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation.

E. Give notices, file plans, obtain permits and licenses, pay fees and backcharges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents.

F. Hoisting Equipment: The Heating, Ventilating and Air Conditioning subcontractor shall furnish, install and maintain in safe and adequate condition all mechanical hoisting equipment, operating personnel and rigging that is necessary for the proper execution of the Work of this Section. The requirements of Section 01500 - Construction Facilities and Temporary Controls, in relation to hoisting and rigging, do not apply to the work of this section.

G. Staging, Planking and Scaffolding: The Heating, Ventilating and Air Conditioning subcontractor shall furnish, install and maintain in safe and adequate condition, all staging, planking and scaffolding up to eight feet in height that is necessary for the proper execution of the Work in this Section.

1. The General Contractor shall furnish, install and maintain in safe and adequate condition all staging, planking and scaffolding above eight feet in height.

1.04 SUBMITTALS

A. Comply with requirements specified in Section 013300 – SUBMITTAL PROCEDURES.

B. Material and equipment requiring Shop Drawing Submittals shall include but not be limited to:

1. Kitchen grease exhaust hood
2. Ansul fire suppression system for kitchen hood
3. Exhaust fans.
4. Make-up air unit.
5. Ductwork, dampers and accessories.
6. Diffusers, registers, grilles.
7. Heating water pump
8. Hot water duct coils.
9. Pipe, pipe hangers, sleeves and inserts.
10. Pipe fittings, valves and strainers.
11. Pressure gauges and thermometers.
12. Vibration isolators.
13. Insulation and acoustical lining.
14. Equipment bases and supports.
15. Motors and Motor starters.
16. Automatic controls.
17. Identification for pipe, duct, valves and equipment.
18. Complete ductwork shop drawings, construction details and duct construction standards.
19. Access panels.

1.05 DEFINITIONS

A. As used in this Section, "provide" means "furnish and install" and "HVAC" means "Heating, Ventilating and Air Conditioning" and "POS" means "Provided Under Other Sections". "Furnish" means "to purchase and deliver to the project site complete with every necessary appurtenance and support," and "Install" means "to unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project."

1.06 CONTRACT DOCUMENTS

A. Listing of Drawings does not limit responsibility of determining full extent of work required by Contract Documents. Refer to Architectural, HVAC, Electrical, Structural, and other Drawings and other Sections that indicate types of construction in which work shall be installed and work of other trades with which work of this Section must be coordinated.

B. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

C. Items referred to in singular number in Contract Documents shall be provided in quantities necessary to complete work.

D. Drawings are diagrammatic. They are not intended to be absolutely precise; they are not intended to specify or to show every offset, fitting, and component. The purpose of the drawings is to indicate a systems concept, the main components of the systems, and the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational.

E. Information and components shown on riser diagrams but not shown on plans, and vice versa, shall apply or be provided as if expressly required on both.

F. Data that may be furnished electronically by the Designer (on computer tape, diskette, or otherwise) is diagrammatic. Such electronically furnished information is subject to the same limitation of precision as heretofore described. If furnished, such data is for convenience and generalized reference, and shall not substitute for Designer 's sealed or stamped construction documents.

1.07 DISCREPANCIES IN DOCUMENTS

A. Where Drawings or Specifications conflict or are unclear, advise Designer in writing before Award of Contract. Otherwise, Designer 's interpretation of Contract Documents shall be final, and no additional compensation shall be permitted due to discrepancies or unclarities thus resolved.

B. Where Drawings or Specifications do not coincide with manufacturers' recommendations, or with applicable codes and standards, alert Designer in writing before installation. Otherwise, make changes in installed work as Designer requires within Contract Price.

C. If the required material, installation, or work can be interpreted differently from drawing to drawing, or between drawings and specs, this contractor shall provide that material, installation, or work which is of the higher standard.

D. It is the intent of these contract documents to have the contractor provide systems and components that are fully complete and operational and fully suitable for the intended use. There may be situations in the documents where insufficient information exists to precisely describe a certain component or subsystem, or the routing of a component. In cases such as this, where the contractor has failed to notify the Designer of the situation in accordance with Paragraph (A) above, the contractor shall provide the specific component or subsystem with all parts necessary for the intended use, fully complete and operational, and installed in workmanlike manner either concealed or exposed per the design intent.

E. In cases covered by Paragraph (D) above, where the contractor believes he needs engineering guidance, he shall submit a sketch identifying his proposed solution and the Designer shall review, note if necessary, and approve the sketch.

1.08 MODIFICATIONS IN LAYOUT

A. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structure and other trades and to meet Architectural requirements.

B. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Designer.

C. Check Contract Drawings as well as Shop Drawings of all subcontractors to verify and coordinate spaces in which work of this Section will be installed.

D. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.

E. Make reasonable modifications in layout and components needed to prevent conflict with work of other trades and to coordinate according to Paragraphs A, B, C, D above. Systems shall be run in a rectilinear fashion.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Designer for review and approval.

1.09 EXISTING CONDITIONS AND PREPARATORY WORK

A. Before starting work in a particular area of the project, visit site and examine conditions under which work must be performed including preparatory work done under other Sections or Contracts. Report conditions that might affect work adversely in writing through Contractor to Designer. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.

1.10 CODES, STANDARDS, AUTHORITIES AND PERMITS

A. Perform work strictly as required by rules, regulations, standards, codes, ordinances, and laws of local, state, and Federal governments, and other authorities that have legal jurisdiction over the site. Materials and equipment shall be manufactured, installed and tested as specified in latest editions of applicable publications, standards, rulings and determinations of:

1. Local and state building, plumbing, mechanical, electrical, fire and health department codes.
2. American Gas Association (AGA).
3. National Fire Protection Association (NFPA).
4. American Insurance Association (A.I.A.) (formerly National Board of Fire Underwriters).
5. Occupational Safety and Health Act (OSHA).
6. Underwriters' Laboratories (UL).

B. Material and equipment shall be listed by Underwriters' Laboratories (UL), and approved by ASME and AGA for intended service.

C. When requirements cited in this Specification conflict with each other or with Contract Documents, most stringent shall govern work. Designer may relax this requirement when such relaxation does not violate ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing.

D. Most recent editions of applicable specifications and publications of the following organizations form part of Contract Documents:

1. American National Standards Institute (ANSI).
2. American Society of Mechanical Engineers (ASME).
3. National Electric Manufacturers Association (NEMA).
4. American Society for Testing and Materials (ASTM).
5. American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
6. Air Moving and Conditioning Association (AMCA).
7. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
8. American Diffuser Council (ADC).
9. Air Conditioning and Refrigeration Institute (ARI).
10. Thermal Insulation Manufacturers Association (TIMA).
11. Institute of Electrical and Electronics Engineers (IEEE).

1.11 RECORD DRAWINGS

A. Comply with requirements specified in Section 017700 – CONTRACT CLOSEOUT.

B. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

1.12 MANUALS, AND OPERATING INSTRUCTIONS, AND PROTECTION

A. Obtain at time of purchase of equipment, three copies of operation, lubrication and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of field assembled units, including as-built wiring diagrams. Manual shall contain names and addresses of manufacturers and local representatives who stock or furnish repair parts for items or equipment. Divide manuals into three sections or books as follows:

1. Directions for and sequence of operation of each item of HVAC system, e.g. air handling units. Sequence shall list valves, switches, and other devices used to start, stop and control system. Detail procedure to be followed in case of malfunctions. Include detailed approved flow diagrams of temperature control, heating, etc. as appropriate for systems provided. Include approved valve directory showing each valve number, location of each valve, and equipment or fixture controlled by valve.

2. Detailed maintenance and trouble shooting manuals containing data furnished by manufacturer for complete maintenance. Include copy of balancing report.

3. Lubrication instructions detailing type of lubricant, amount, and intervals recommended by manufacturer for each item of equipment. Include additional instructions necessary for implementation of first class

lubrication program. Include approved summary of lubrication instructions in chart form, where appropriate.

B. Furnish three copies of manuals to Designer for approval and distribution. Deliver manuals no less than 30 days prior to acceptance of equipment to permit User Agency's personnel to become familiar with equipment and operation prior to acceptance.

C. Provide framed and glazed charts as follows: mount as directed by Designer.

1. Flow diagrams from first part of manual as described above.
2. Valve directory.
3. Lubrication chart from third part of manual.

D. Operating instructions: Upon completion of installation or when client accepts portions of building and equipment for operational use, instruct User Agency's operating personnel in any or all parts of various systems. Instructions shall be performed by factory-trained personnel. client shall determine which systems require additional instructions. Duration of instructions shall take equipment through complete cycle of operation (at least five working days). Make adjustments under operating conditions.

E. Each contractor shall be responsible for his work and equipment until finally inspected, tested, and accepted. Carefully store materials and equipment which are not immediately installed after delivery to site. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material.

F. Each separate contractor shall protect the work and material of other trades that might be damaged by his work or workmen and make good all damage thus caused.

PART 2 - PRODUCTS

2.01 DUCTWORK AND AIR DISTRIBUTION EQUIPMENT

A. Reference Standards

1. Material, construction and installation shall meet requirements of most recent editions of the following standards and references, except for more stringent requirements specified or shown on Drawings:

Standard	As Applicable To
SMACNA HVAC Duct Construction Standards Metal and Flexible	Sheet Metal Ductwork; Duct Liners; Adhesives; Fasteners; Flexible Ductwork.
SMACNA HVAC Air Duct Leakage Test Manual	Duct Leakage Testing
SMACNA Fibrous Glass Duct Construction Standards	Fibrous Glass Ductwork; Tapes
ADC and TIMA Flexible Duct Performance Standards	Flexible Ductwork
NFPA 90A	Fire Dampers; Fire Resistance Standards for Ducts and Liners
NFPA 96	Kitchen Hood Exhaust Ductwork
ADC Test Code 1062 R4	Ratings of Diffusers, Registers Grilles
SMACNA Guidelines for Welding Sheetmetal	Welded Galvanized, Black Iron and Stainless Steel Ductwork

B. General

1. Provide supporting and hanging devices necessary to attach entire HVAC system including ductwork and equipment, and to prevent vibration.
2. Provide vertical and horizontal supports as required by codes to meet minimum applicable earthquake resistance standards.
3. Ductwork shall be free from vibration under all conditions of operation. Dimensions shown on Drawings for lined ductwork are net inside dimensions. Increase ductwork to accommodate lining requirements.
4. Pipe or conduit crossing duct:

    a. No pipe, conduit, hanger, Architectural element nor structural member shall pass through duct without Designer 's written approval.

b. Where it is impossible to re-route pipe or conduit and when written approval has been obtained, increase duct size to maintain cross-sectional area at point of interference. Provide streamlined enclosure for pipe or conduit, as illustrated in SMACNA.

5. When making offsets and transformations necessary to accommodate structural conditions, preserve full cross-sectional area of ductwork shown on Drawings.

C. Ductwork shall have pressure-velocity classifications as follow:

DUCT CONSTRUCTION CLASS	STATIC PRESSURE RATING	PRESSURE	SMACNA SEAL CLASS	SMACNA LEAKAGE CLASS	VELOCITY
3"	3"	Pos. or Neg.	A	6	4000 fpm or less
2"	2"	Pos. or Neg.	B	12	2500 fpm or less
1"	1"	Pos. or Neg.	B	12	2500 fpm or less
½"	½"	Pos. or Neg.	B	12	2000 fpm or less
*for negative pressures over 3" w.g., refer to SMACNA Round and Rectangular Industrial Duct Construction Standards for joint and intermediate reinforcement requirements.					

1. Sealing Requirements for Class A, Leakage Class 3, Galvanized, Non-Welded Aluminum or Non-Welded Stainless Steel Ductwork:

a. Transverse Joints

1) During assembly seal all flanged transverse joints with sealing tape of quality equal to Hardcast Inc. 1902-FR. Corners shall be sealed as described by SMACNA and when applicable per manufacturer's published procedures. After sealant has cured, seal entire joint with Hardcast Inc. RTA-50 adhesive on to Hardcast Inc. DT tape or approved equal.
2) Seal all non-flanged transverse joints with Hardcast Inc. RTA-50 adhesive on to Hardcast Inc. DT tape or approved equal.

b. Longitudinal Seams: Seal all longitudinal seams during ductwork fabrication with Hardcast Inc. Cold Seal 1001 or approved equal.

c. Joints and Ductwall Penetrations

1) Seal all duct joints at takeoffs, access doors, damper bearing penetrations, flexible duct connections etc., with Hardcast Inc. Versa Grip 102 or approved equal.
2) Note, access doors and damper rod penetrations shall be equipped with proper hardware for sealing.

2. Support

a. Space hangers as required by SMACNA (8 ft max) for horizontal duct, unless concentrated loadings require closer spacing.
b. Support vertical duct on each floor or slab it penetrates. Or as required for vertical ducts running up building exterior. Provide epoxy bond bolts for supports at brick walls.
c. Supports for ductwork and equipment shall be galvanized unless specified otherwise.

3. Connections

a. Connect inlets and outlets of air handling units and fans to ductwork with flexible connections unless fan has vibration isolator mounts inside unit with flexible connections and no external vibration isolators. Exception: Do not use flex on life safety smoke exhaust fans.
b. Indoors, flexible connections shall be neoprene-coated fibrous glass fire retardant fabric, by Ventfabrics, or Durodyne. Outdoors, flexible connections shall be Dupont hypalon- coated fibrous glass fire-, weather-, and UV-resistant by Ventfabrics or Durodyne.
c. Secure flexible connections tightly to air handlers with metal bands. Bands shall be same material as duct construction.

4. Construction

a. No sharp metal edges shall extend into air streams.
b. Install drive slips on air-leaving side of duct with sheet metal screws on 6" centers.
c. Spin in collars shall NOT be used for branch connections in 3" or higher pressure class ductwork.

5. Joints

a. Longitudinal lock seams shall be double-locked and flattened to make tight joints.
b. Make transverse joints, field connections, collar attachments and flexible connections to ducts and equipment with sheet metal screws or bolts and nuts. Do not use rivets and staples.

6. Prefabricated Transverse Duct Joints

a. Transverse joints in galvanized sheet metal ductwork may be made with galvanized gasketed frame and angle duct joint system

by Ductmate, TDF, TDC or approved equal. Angles shall be at least 20 gauge. Prefabricated transverse duct joints shall not be used for duct 16 GA. and heavier, nor for duct 23 GA. or lighter.

b. Secure angles to duct with screws (using clutched arbor) or spot-welds spaced as recommended by manufacturer for duct pressure class.

7. Elbows and Bends

a. Elbows and bends for rectangular ducts shall have centerline radius of 1-1/2 times duct width wherever possible. Elbows for grease exhaust and fume hood exhaust shall be full radius. Vanes or mitered duct are not allowed.

b. Where centerline radius is less than 1-1/2 times duct width (on supply, return and exhaust ductwork), elbows shall be radius throat (square throat allowed when turning around column or other close objects) with radius heel. For elbows whose width is greater than 48 inches and/or where shown on plans, provide splitter vanes. Install vanes in accordance with SMACNA. Where multiple elbows are separated by less than ten duct diameters use splitter (full length) vanes.

8. Access Panels/Doors

a. Provide proper pressure and leakage rated, gasketed, duct mounted access panels/doors for the following items with minimum sizes, as indicated. Access doors shall be of double wall construction - doors in insulated ducts shall be insulated. Gauges of door materials, no. of hinges, no. and type of door locks shall be as required by the SMACNA Duct Construction Standards. Hinged doors are not acceptable, screwed or bolted access panels are not acceptable. Doors shall be chained to frame with a minimum length of 6" to prevent loss of door.

b. For seal Class A, access doors shall be leakage rated, neoprene gasketed UL 94 HF1 listed, DUCTMATE "sandwich" or approved equal. Door metal shall be the same as the attached duct.

c. For grease and high temperature ducts, door assembly shall be rated for 2300°F.

d. The minimum access door sizes shall be:
   1) Manual volume dampers 2 sq. ft. and larger - 6" x 6".
   2) Inlet side to all coils - 12" x 12", or larger.

e. Generally access doors are not shown on the drawings, but shall be provided in accordance with the above.

9. Extractors shall have adjusting rod and locknut on outside of duct.

10. Duct Pressure Tests

a. Pressure test ducts after takeoffs and wall penetrations are in place and before applying exterior insulation. Correct any leaks.

b. Pressure and leak test 100% of medium and low pressure duct work at 150% of duct construction class pressure. Duct shall be constructed for no joint or structural failure at the test pressure.

11. Duct Leakage Tests

a. Leak testing shall be per SMACNA HVAC Air Duct Leakage Test Manual. Provide orifice assembly including straightening vanes, orifice-plate mounted in straight tube with properly located pressure taps, and U-tube manometer or other device as specified by SMACNA. Orifice assembly shall be calibrated accurately and shall come with calibration curve. Leakage classes shall be as previously specified. Submit leak test report (per SMACNA format) for Designer review. Drawings of ductwork tested shall also be submitted with report, indicating presence of takeoffs, wall penetrations, joints, etc.

12. Materials

a. Sheet metal ducts shall be constructed of hot-dipped galvanized sheet metal with G90 Commercial coating according to ASTM 527 unless specified otherwise.
b. Grease exhaust ductwork shall be 18 gauge for kitchen hoods; and as required by SMACNA. Joints and seams shall be welded as required by SMACNA Guidelines for Welding Sheetmetal.
c. Aluminum ductwork shall be Alclad 3003-1414 or alloy 5052-H32, of thickness required by the SMACNA duct construction standards with Alloy 6061 bracing angles, and Pittsburgh lock longitudinal corner and double side seaming.

13. Flexible Ductwork connecting to uninsulated or unlined duct, shall be polyester core with corrosion-resistant helical wire reinforcing. The polyester core shall be minimum two ply and shall have a minimum thickness of 0.0017". Flex duct shall be U.L. rated for 6" W.C. positive pressure, 2" W.C. negative pressure with a maximum velocity of 4000 FPM. Flexduct must be listed as a Class 1 Connector according to UL 181 and shall meet the requirements of NFPA 90A - maximum ASTM E-84 fire hazard rating shall be 25 flame spread, 50 fuel contributed and 50 smoke developed. Uninsulated flexible duct shall be equivalent to Wiremold, Type WB, or Flexmaster Types 2 and 4 (not type 9).

a. Flexible duct connected to insulated or lined duct shall also be insulated and shall be equivalent to Wiremold Type WK or Flexmaster Types 2 or 4 (not type 9), with 1-1/2", 3/4 lb. density fiberglass insulation and an aluminized reinforced vapor barrier.
b. Submittals shall include data on no. of polyester plies and minimum thickness of polyester core, in addition to other data listed above required to ensure that submitted product meets the requirements of these specifications.

c. If flexduct other than the model numbers of the vendors listed above is submitted, a sample of the flex shall be submitted to the Designer. The Designer shall have sole discretion in determining whether the submitted flex is equivalent to that of the named vendors above.
d. Unless otherwise indicated, flexible duct shall not exceed 5'-0" long.

D. 2" and Lower Pressure Class Ductwork - Rectangular

1. Ducts wider than 19" with more than 10 square feet of unbraced panel shall be beaded or cross-broken. Internal stiffening struts shall only be used upon prior written approval of the Designer.

2. Make changes in duct size with tapered connections as required by SMACNA. Changes shall NOT exceed 30°from line of air flow. Take-off to the diffusers shall be 45° leading edge type or Bellmouth type.

3. Transverse joints shall be TDF/TDC or slip joints; use flat or standing seam according to SMACNA. Where duct size requires standing seam but space restrictions dictate flat seam, notify Designer prior to fabrication.

E. 2" and Lower Pressure Class Ductwork - Round

1. Longitudinal joints shall be spiral seam, butt welded, lap and seam welded, or ACME lock-grooved seam.

2. Snap lock seams shall be used on ½" w.g. pressure class only.

3. Transverse joints shall be beaded sleeve joint or other approved joints listed in SMACNA. Use three or more sheet metal screws at 15" uniform intervals along circumference of joints.

4. Branch fittings shall be conical tee (Buckley or equal) or combination tee as shown in SMACNA.

F. 3" and 4" Pressure Class Ductwork - Rectangular

1. Joints shall be prefabricated type by TDC, TDF or Ductmate. See Prefabricated Joints paragraph for specific requirements.
2. Duct reinforcement spacing and type shall comply with SMACNA.
3. Ductwork on both sides of transitions shall be run in same horizontal axis.
4. Diverging section slope shall be 1-1/2" per foot or less if possible.
5. Contraction section slope shall not exceed 7" per foot.
6. Takeoffs shall be 45° leading edge type except that Bellmouths (Buckley or equal) may be used for takeoffs to terminal boxes if the distance between the box and point of takeoff is less than 8 ft.
7. Ducts with an aspect ratio greater than 3:1 shall be minimum of 18 gauge unless a thicker gauge is required by SMACNA.

G. Flexible Rigid Duct

1. Flexible ductwork shall be Flexmaster Triple-Lock Buck Duct Flexible Air Duct (insulated or non-insulated) as manufactured by Buckley Associates or equal (617-878-5000). Flexible duct, non-insulated, shall be Underwriters Laboratory Listed UL 181 Class 0 air duct and constructed in accordance with NFPA Standards 90A and 90B. It shall have a smoke/flame spread rating of 50/25.
2. Duct shall be made from a tape of dead soft aluminum sheet, spiral wound into a tube and spiral corrugated to provide strength and stability. The joint shall consist of a triple lock mechanically performed without the use of adhesives to make a durable airtight seam. A double lock is not acceptable.
3. Flexible duct connected to insulated or lined duct shall also be insulated. Flexmaster insulated flex shall have a gray Fire Retardant Polyethylene outer jacket with a ½ lb. density, 1-1/2" thick fiberglass insulation blanket, factory wrapped. Flexible Duct, insulated, shall be Underwriters Laboratory Listed and constructed in accordance with NFPA standards 90A and 90B. It shall have a smoke/flame spread rating of 50/25.
4. The flexible duct shall be supported as required.
5. Flexible duct work shall be rated at 12" positive pressure. Duct from 3 to 16" shall have a negative pressure of 12", 8" for duct work 18 and 20.
6. All flexible duct shall be individually cartoned and labeled for delivery to the job site for maximum protection.
7. Submittals shall include data on minimum thickness of aluminum core, in addition to other data listed above, required to ensure that submitted product meets the requirements of these specifications.
8. Provide sealing compound for installation. See further paragraphs in this specification and details for other installation requirements.

H. Volume Dampers

1. Provide Young Regulator manual adjustable rectangular opposed blade dampers for duct heights less than 12" with factory-installed locking hand quadrants extended 2" for all dampers installed in externally insulated duct: Note: not all are shown on drawing but are to be provided and as required to provide proper system balancing.

   a. On each supply, return and general exhaust duct take-off.
   b. At each take-off to register, grille or diffuser

2. Dampers shall be manufactured approximately 5/16" smaller in width and 1/8" smaller in height than size of duct in which they are installed; e.g., nominal damper size is 24" x 10"; actual size is approximately 23-11/16" x 9-7/8".

3. Damper frame shall be constructed of #6063 extruded aluminum reinforced channel with minimum thickness of .050". Opposed damper blades shall be #6063 extruded aluminum with minimum thickness of

.050" and shall include reinforcing ribs. Each blade shall be supported in the damper frame by individual Teflon axle bearings, and shall be driven by stainless steel connecting slide linkage controlled by 3/8" square steel control shaft.

4. Dampers 12" and larger in height shall be opposed multi-blade equal to Greenheck, Nailor, or Vent Products.

5. Where dampers are inaccessible, use Young Regulator locking type ceiling regulators and miter gear or worm gear for all horizontal dampers. Bearing coupling for bottom duct control may be used for shaft on vertical blade dampers. The 3/8" rod between ceiling regulator and damper shall be provided by contractor.

6. Damper blades shall be two gauges heavier than adjoining ductwork, and shall be riveted to supporting rods. Hem over edges parallel to rods.

7. Brackets shall be galvanized metal, secured to ductwork with sheet metal screw with locking quadrant arms (see seal class section for additional requirements). Provide 2" handle extension for all dampers on externally insulated ductwork.

I. Diffusers, Registers and Grilles

1. Provide diffusers, registers and grilles for supply, return and exhaust outlets, of size, type and design shown on Drawings. Acceptable manufacturers shall be Anemostat, Krueger, Metalaire or Titus.
   a. Equipment shall be tested and rated per ASHRAE 91-70.

2. Equipment shall handle air quantities at operating velocities:
   a. With maximum diffusion within space supplied or exhausted.
   b. Without objectionable air movement as determined by Designer.
   c. With sound pressure level not to exceed NC 30.

3. Supply, return and exhaust outlets shall have opposed blade volume dampers operable from front. Supply registers shall have two sets of directional control blades.

4. Diffusers within same room or area shall be of same type and style to provide Architectural uniformity.

5. Diffusers, registers and grilles shall be furnished with gaskets and installed with faces set level and plumb, tightly against mounting surface.

6. Finish shall be as directed by Designer.

7. Coordinate diffusers, registers and grilles with ceiling and wall construction. Refer to Architectural Drawings for exact lengths and for framing and mitering arrangements that may differ from those shown on HVAC Drawings.

J. Branch Duct Take-off Fittings: Contractor shall provide Buckley Bellmouth Take-offs at all branch duct locations. Bellmouth Fitting shall be Model BMD with damper as manufactured by Buckley Associates. In areas where sufficient duct height is not available, the contractor shall provide the Buckley Mini-mouth fitting, Model M-BMD with damper or the flat oval Bellmouth, Model FOBMD with damper.

1. Bellmouths shall be constructed of heavy-duty galvanized steel. Bellmouths shall include an air-tight Neoprene gasket to ensure a tight fitting with minimal leakage. Pre-drilled holes shall be provided for quick mounting.

2. Standard damper hardware to be constructed of 26-gauge galvanized material with a quadrant damper and tight-fitting gasketing to ensure minimal leakage at damper pivot points.

3. Optional heavy-duty hardware shall be provided at locations of higher static pressure where shown on the drawings.

4. Ninety-degree take-offs are not permitted on this project.

2.02 Kitchen Hood Exhaust Duct- Factory built option

A. Furnish and install, where indicated on the drawings, a factory-built Underwriters Laboratories, Inc. listed Grease Duct as manufactured by Van Packer Co, Metalbestos, or Metalfab. The chimney shall be listed by UL as a "Grease Duct for Restaurant Cooking Appliances."

B. The grease duct manufacturer shall furnish all items which form a part of the assembly, including tee sections, straight sections, elbows, end caps, cleanouts, expansion joints, fan/hood transitions, supports, flashing, counter flashing, and insulated roof thimble where required. Each section shall be the factory-applied Underwriters Laboratories label.

C. Installation shall be made in accordance with the manufacturer's recommendation and in compliance with the Underwriters Laboratories, Inc. listing.

D. All grease duct sections shall be of double-wall construction with a 1" air space between the liner and the shell. The liner shall be 20 gauge, type 304 stainless steel and the shell shall be of 24 gauge aluminized steel.

E. All sections shall be joined with a vee band sealed with acid resistant hi-temp joint cement. Silicone sealant shall also be used on the drawband on exterior installations. Parts exposed to the atmosphere shall be given one prime coat and one finish coat of heat-resistant paint (supplied by the installing or painting contractor).

F. Diameter and layout shall be as indicated on the drawings.

1. Provide cleanout openings with grease-tight access panels at each change of direction and at 10 ft. intervals along straight duct runs.

2. Provide dished pan at bottom of risers with 2" half-coupling, removable plug, welded to bottom center of pan.

3. Diverging and converging transitions shall not exceed 20°from line of air flow.

4. Horizontal duct sections shall not form grease traps and shall pitch toward hood as required by NFPA.

G. Vertical and horizontal interior duct shall have fire resistant cover or enclosure, and spacing from combustible surfaces, etc. as defined by NFPA and in accordance with manufacturers instructions.

2.03 DUCT INSULATION

A. General: Insulation shall be Certain-Teed, Knauf, Manville or Owens Corning or equal. Install insulation, mastics, adhesives, coatings, covers, weather-protection and other work exactly as required by manufacturer's recommendations. Materials shall meet requirements of Adhesive and Sealant Council Standards and SMACNA.

1. Apply insulation after systems have been tested, proved tight and approved by Designer. Remove dirt, scale, oil, rust and other foreign matter prior to installation of insulation.
2. Leaks in vapor barrier or voids in insulation will not be accepted.
3. ASTM E-84 minimum fire hazard ratings shall be 25 flame spread, 50 fuel contributed and 50 smoke developed.
4. Where ducts are insulated, flexible connections to ducts shall be insulated.
5. Insulate standing seams with same material and thickness as duct.
6. Acoustically lined ductwork shall not be insulated externally, except as noted otherwise.
7. Return ductwork in ceiling plenums shall not be insulated.
8. Insulation shall be continuous through wall and ceiling openings and in sleeves.
9. Transmission rates of vapor barriers shall not exceed 0.02 perms.

B. Kitchen Hood Grease Duct 2 hour Insulation

1. Provide material and equipment to provide a 2-hour fire-resistive rated duct enclosure and a method for providing zero clearance to combustibles for commercial kitchen grease duct exhaust systems.

a. Submit product data sheet and installation instructions showing system performance and Code compliance
b. Deliver materials in original unopened packages, clearly marked with manufacturer's name, product designation, manufacturer's lot numbers and appropriate third party classification listings. Store in a covered dry environment.

2. System description: Product shall be a lightweight (maximum nominal 6 pcf), non-asbestos, bio-soluble, high temperature, inorganic, noncombustible, foil encapsulated insulation blanket. The blanket material must capable of performing at 2000°F, matching the internal and external fire test temperature for grease ducts. The duct wrap system shall be a tested and listed system evaluated for reduced clearances to combustibles and as an alternative to a two-hour fire rated grease duct shaft enclosure. Testing shall be conducted at a nationally recognized testing laboratory

3. Performance requirements shall meet the following:

a. Zero clearance to combustibles across the entire surface of the blanket material, per the internal fire test of ASTM E2336.
b. 2-hour fire resistive enclosure assembly per ASTM E-119.
c. Firestop system, tested per ASTM E-814, 2-hour F and T Ratings.

4. Product shall be equal to FyreWrap Elite 1.5 Duct Insulation as manufactured by Unifrax I LLC, of Niagara Falls, NY and include the following materials:

a. A lightweight, nominal 1.5" thick, 6pcf, inorganic, non-asbestos, noncombustible, bio-soluble, high temperature, core insulation blanket.
b. Flexible, fully encapsulated duct wrap to provide 2-hour fire resistive enclosure assembly per codes and standards listed in 1.02 of this document.
c. Blanket insulation must maintain a 2012ºF operating temperature
d. Provide rated access doors (for cleanout as required) to maintain 2-hour rating and required clearance.
e. Provide firestop sealants, tape, insulation pins, clips, banding and other components as per manufacturer's instructions to ensure installation complies with the complete tested system and corresponding Design Listing(s).

5. Install duct wrap system in accordance with manufacturer's installation instructions
a. Inspect and verify that ductwork has been tested and installed properly before applying duct wrap material.
b. Inspect and verify that all surfaces are smooth, dry, clean and free from dust, debris, or other loose materials. Surfaces must be dry before the application of duct wrap materials.

C. Outdoor Rectangular Duct Insulation and Water-proofing-Option 1

1. For MUA-1 SA duct, provide 2" thick, 6 lb./cf density fibrous glass rigid board insulation with maximum K-factor of 0.22 at 75°F mean. Secure with 100% coverage of approved adhesive and mechanical fasteners, such as weld pins with speedwashers, spaced as required by manufacturer's installation instructions.
2. Boards shall be cut or grooved to fit duct and to form compressed, overlapped or mitered longitudinal joints oriented to shed water.
3. Apply two coats of bitumastic coal tar vapor barrier to outer duct insulation surface, with woven glass cloth embedded between first and second coats. Water-proofing shall not allow transmission of water vapor. Total dry-film thickness shall be 1/8".

D. Outdoor Duct Insulation and Water-proofing-Option 2

1. For MUA-1 SA duct, provide 2" thickness of flexible unicellular elastomeric foam rubber sheet insulation by Armstrong (Armaflex), Manville, Owens Corning or Halstead-Nomaco (insultube), with maximum K-factor of 0.27. Install as recommended by manufacturer.
2. Insulate standing seams with same thickness as duct.
3. Adhere insulation to duct and seal butt joints with full coverage of Armstrong 520 or approved equal adhesive.
4. Apply two coats of approved vinyl lacquer coating over woven glass yarn mesh adhered to insulation surface with Insulcolor or approved equal lagging adhesive.

2.04 ACOUSTICAL DUCT LINING

A. Provide 1" thick hospital grade, close cell foam liner by IMCOA EPFI or equal. No fiberglass is allowed. Increase duct dimensions to accommodate lining while maintaining inside clear dimensions shown on the drawings.

1. Provide lining for MUA-1 supply from on run exposed to weather from MUA-1 discharge across roof and down side of building to duct run in celing cavity. This is an option to providing external insulation with weather proof covering.

B. Duct liner shall be installed without interruptions or gaps, using 100% coverage of adhesive and mechanical fasteners. Mechanical fasteners shall be welded or secured mechanically to duct on 12" maximum centers.

C. Cut liner to ensure overlapped and compressed longitudinal joints at corners. Transverse joints in liner shall abut precisely. Seal joints against fiber entrainment with approved adhesive, as recommended by manufacturer. Use sheet metal nosing at beginning of lining (in direction of flow) to minimize erosion.

D. The contractor shall ensure the integrity of acoustical lining when slip in duct heaters are installed; loose lining shall not flap about in the airstream. Secure edges of lining with sheet metal nosing, where liner is interrupted to make room for the slip in heaters.

E. Submit samples and catalog data for duct liner, mechanical fasteners, and adhesive to Designer for approval.

F. Materials and installation shall meet following standards, as applicable:

1. NFPA-90A, UL723 (Class I), NFPA-255
2. SMACNA Duct Liner Applications Standard
3. SMACNA Mechanical Fasteners Standard
4. Adhesive and Sealant Council: Adhesives Standard for Duct Liner - ASC-A-7001A
5. ASTM E-84 fire hazard classifications of 25 flame spread, 50 smoke developed, and 50 fuel contributed.
6. Minimum sound transmission. Class rating (STC) of 11.
7. Mylar used for vapor barrier shall meet ASTM E-84 classification.

2.05 PIPING AND FITTINGS

A. General: Pipe materials and fitting materials shall be as indicated in Schedule of Pipe and Fitting Materials.

B. Schedule of Pipe and Pipe Fitting Materials

SERVICE	SYSTEMS DESCRIP-TION	PIPE SIZE	PIPE MATERIAL	JOINTS	FITTING MATERIAL	FITTING RATING PSI/CLASS/ WEIGHT
Hot Water	HWS/R	2" and under	Copper, B88, Type L or Steel A53, Grade B, Smls or ERW, Schedule 40	Soldered 95/5 Tin/ Antimony Threaded	Wrought copper, B16.22 Malleable Iron, B16.3	Class 150 Class 150

C. Connections

1. Provide dielectric fittings at connections of dissimilar materials.
2. Provide eccentric reducing couplings to bring pipes flush on top for water service and flush on bottom for steam service.
3. Branch lines in welded piping shall be made with welding tees except that branch lines less than one-half diameter of main may be made with Weld-O-Lets or Sock-O-Lets.
4. Nipples shall be same material, make and thickness as pipe with which they are used. Close nipples shall not be used.

5. Make piping connections 2" dia. and smaller to valves and equipment with steel body, 300 psi brass seat unions on steel piping and with heavy semi-flushed brass unions on copper tubing.
6. Make screw joints tight with Teflon (polytetrafluoroethylene) tape or litharge-glycerin mixture applied to male threads. Use tapered threads.

2.06 PIPE INSULATION

A. Insulation shall be fibrous glass insulation with factory-applied fire retardant vapor barrier jacket with K factor of 0.21 at 75°F mean temperature by Owens Corning, Certain-Teed, Manville or Knauf, installed as required by manufacturer. ASTM E-84 fire hazard ratings shall be 25 flame spread, 50 smoke developed and 50 fuel contributed.

B. Apply insulation after systems have been tested, proved tight and approved by Designer. Remove dirt, scale, oil, rust and foreign matter prior to installation of insulation. No leaks in vapor barrier or voids in insulation will be accepted.

C. Insulation and vapor barrier on piping which passes through walls or partitions shall pass continuously through sleeve, except that piping between floors and through fire walls or smoke partitions shall have space allowed for application of approved packing between sleeves and piping, to provide firestop as required by NFPA. Seal ends to provide continuous vapor barrier where insulation is interrupted.

D. Insulate flexible connections to same thickness and with same material as adjoining pipe insulation.

TABLE A Insulation Thickness

PIPING SYSTEM TYPES	FLUID TEMPERATURE RANGE, F	1" & LESS	1-1/4" TO 2"	2-1/2" TO 4"	INSULATION CONDUCTIVITY BTUH/IN/F.HR.SF AT TEMP F
Hot Water Med temp.	141-200	1.5	1.5	1.5	0.25 @ 125
Hot water Low temp.	105-140	1.0	1.0	1.0	0.24 @ 100

E. Insulation on Fittings, Valves and Flanges

1. Fittings, valves and flanges shall be insulated with pre-cut, factory-supplied fibrous glass, by Certain-Teed, Knauf, Owens Corning or Manville.
2. Fittings, valves and flanges shall be insulated with same material and to same thickness as adjoining pipe insulation.
3. Pipe fittings shall be pre-tested, clean and dry before insulation.
4. Installation of insulation on fittings shall be as follows, in order:

a. Wrap insulation around fitting and tuck ends into fitting throat.
b. Edges of adjacent insulation shall be tufted and tucked in, to fully insulate fitting to thickness of adjacent pipe insulation. Use two or more thicknesses if necessary.
c. If two layers of insulation are used on fittings, wrap and secure first layer with twine before applying second layer.
d. Top layer of insulation shall be covered with one piece, PVC, Zeston molded fitting cover. Secure cover with stainless steel tack fasteners inserted into jacket throat overlap seam.
e. Tape joints with pressure-sensitive vapor barrier tape; tape shall extend 2" on either side of joint.

5. Prior to taping of joints on chilled water lines, apply vapor barrier mastic (brushed on) to fitting cover, throat overlap and edges. Also apply vapor barrier mastic to pipe insulation jacket ends.

6. For strainers and other valves or fittings which need maintenance, provide preformed removable insulation section.

2.07 PIPE HANGERS AND SUPPORTS

A. Provide pipe stands, supports, hangers and other supporting devices in accordance with ANSI B31.9 and MSS-69, as necessary to support work required by Contract Documents.

B. Secure vertical piping to building construction to prevent sagging or swinging.

C. Space hangers for horizontal piping as follows:

Pipe Size	Rod Diameter	Maximum Spacing
Up to 1-1/4"	3/8"	8 ft.-0"
1-1/2 and 2"	3/8"	10 ft.-0"
2-1/2 and 3"	½"	10 ft.-0"

D. Horizontal copper tubing shall have maximum hanger spacing of 5 ft. for tubing 1-1/4" dia. and smaller and 10' for tubing 1-1/2" and larger. Maximum spacing for PVC pipe hangers shall be 4'.

E. Reduce spacing to a maximum of 10'- 0" apart, regardless of pipe size, as necessary for fittings, valves and other concentrated loads.

F. Support piping 4" dia. and larger from structure with pipe roll hangers with adjustable steel rod hangers, sized to accommodate insulation.

G. Support piping 3" dia. and under from structure with Carpenter and Patterson Fig. 100 clevis hangers or approved equal.

H. Hangers shall be by Carpenter and Patterson, F & S, or Grinnell Co. Figure numbers of Carpenter and Patterson are specified to establish standards of quality for performance and materials.

I. Provide spring hangers with travel stops as specified in Vibration Isolation Paragraph where necessary and where shown on Drawings.

J. Pipe supports for 4" and larger pipe and insulated high-temperature piping shall have welded inserts of equal thickness to insulation to prevent compression of insulation. Other insulated pipe shall have 12", 14 GA shields at hangers, composed of 180°coverage of galvanized sheet metal and high density, pre-formed, rigid insulation. Where rollers are required, shield shall be steel pipe.

K. Hangers for horizontal lines shall be vertically adjustable to obtain pitch requirements of Piping Paragraph.

2.08 SLEEVES AND PENETRATIONS

A. Pipe Sleeves

1. Sleeves through floors and through exterior, structural and fire-rated construction shall be hot-dipped galvanized Schedule 40 steel pipe. \
   a. Provide waterproofing membrane locking devices at floors.
   b. Provide 150 lb. slip-on welding flanges at exterior wall penetrations
2. Sleeves through partitions and non-fire-rated construction shall be 26 gauge galvanized steel with lock longitudinal seams, or approved plastic pipe.

B. Duct Sleeves and Openings

1. Sleeves through floors, through exterior structure, through fire-rated construction and through smoke partitions that require smoke dampers shall be Schedule 40 galvanized steel pipe for round duct and shall meet SMACNA Fire Damper and Heat Stop Guide for rectangular and flat oval ducts. Fireproof packing shall be applied to seal any openings between sleeve and wall. Materials shall maintain the fire rating of the wall, and shall be installed in accordance with the SMACNA Fire Damper and Heat Stop Guide.
2. Openings in walls, partitions and other fire-rated construction that do not require smoke dampers shall meet NFPA 90A, Section 3-3.8.
3. Materials for prepared openings in partitions shall match construction penetrated.

C. Pipe Sleeve Packing

1. Packing between the pipe and the sleeve (or wall or slab opening) in fire rated walls or slabs shall be a combination of fireproof insulation and fireproof caulk. The combination of materials shall have the same fire rating, in hours, as the wall or slab, as tested in accordance with the latest edition of ASTME-814 (UL 1479). The combination of materials shall be classified by UL, (fill, void or cavity materials) for the fire rating required and shall be listed as a numbered system in the UL Fire Resistance Directory. Fiberglass shall not be used as the insulation material.

2. Acceptable fireproof insulation materials shall be: Kaolin (Kaowool by Babcock and Wilcox); ceramic fiber blanket (Fiberfrax by Standard Oil) or fire rated mineral wool (Thermafiber by USG). Acceptable fireproof caulks shall be: Silicone (Firestop by Dow Corning, Hilti CS240); ceramic fiber (Fyreputty by Standard Oil) or intumescent synthetic elastomer (Fire Barrier Caulk by 3M, Hilti CS2420).

3. Packing for sleeves that do not require maintenance of fire rating shall be oakum, silicate foam, ceramic fibre or mineral fibre with approved sealant. Pack or foam to within 1" of both wall surfaces. Seal penetration packing with approved caulking and paintable water-proof mastic surface finish or silicone caulking.

4. All materials must be installed in accordance with manufacturers instructions; all gaps must be sealed. Finish caulk flush with wall or slab surface if piping runs exposed.

D. Other Water-proof Pipe Penetrations

1. Modular mechanical penetration seals shall be interlocking synthetic rubber links shaped to fill annular space continuously, with galvanized carbon steel bolts, nuts and pressure plates to expand rubber seal between pipe and sleeve. Sleeve seal shall be water-tight.

2. Prefabricated modular sleeves shall be Mason Industries (SWS) or approved equal stiffened galvanized steel sleeves with preformed closed-cell elastomeric seal (non-fire-rated) or preformed mineral fiber or silicone foam seal (fire-rated).

3. Provide water-proof 1" single ring set in silicone and bolted to floor or wall at chipped and drilled penetrations of existing slabs on grade and existing walls below grade.

2.09 MOTORS, STARTERS AND WIRING

A. Provide motors and controls for HVAC equipment, except units served by MCC provided under Section 16000, ELECTRICAL WORK. Provide control and other related wiring including interlocks. Power wiring (to panelboards, disconnect switches, starters and motors) will be provided under Section 16000, ELECTRICAL WORK. Starters that are not integral to equipment will be furnished, installed and wired under Section 16000, ELECTRICAL WORK.

B. Unless otherwise specified, motors shall be NEMA Design B, constant speed, self-ventilated squirrel cage induction. Motors shall have 1.15 service factor unless totally enclosed. Motors shall have Class B insulation.

1. Motors under 1/2 hp, shall be designed for 120 V, 60 Hz, single phase, unless otherwise specified.
2. Motors ½ hp and over shall be as required in schedules.

C. All motors shall be high or premium efficiency type. They shall conform to NEMA Standard MG-1-12.53a and shall have their efficiencies determined in accordance with IEEE Standard 112 Method B. The NEMA nominal efficiency shall be listed on the motor nameplate. Minimum nominal efficiencies shall be as follows:

Size (HP)	Nominal Efficiency (Min.)
1 – 3	84%
5 - 7-1/2	88.5%

D. Starters furnished integral to equipment, and that require interlocks or remote control shall be magnetic with HAND-OFF-AUTOMATIC switch in cover. Provide magnetic starters as necessary, with auxiliary contacts, buttons and switches in required configurations. Refer to paragraph AUTOMATIC TEMPERATURE CONTROLS and to Control Drawings for interlock requirements.

1. Each 3-phase, 60 Hz motor shall be provided with magnetic starter with either ON-OFF push button or hand-off-automatic switch.
2. Other motors shall be provided with a manual starter with ON-OFF switch.
3. Control relay for each starter shall be for operation on 120 V, single phase, and transformer of sufficient capacity within starter case shall be furnished for this purpose.

4. Provide inverse time limit overload and under voltage protection in each leg and with pilot lights. Provide red and green On-Off pilot lights.
5. Provide nameplates with engraved white lettering to designate area and equipment served.
6. Starters for refrigeration machines shall be furnished by unit manufacturer.
7. Provide starters for two-speed motors with deceleration relay.
8. Furnish for all single speed motors, 25 hp and above, 95% power factor correction capacitors. Capacitors shall be in NEMA enclosure of the same rating as the motor's starter.

2.10 CENTRIFUGAL PUMPS

A. General Requirements: Provide, where shown on drawings, centrifugal pumps, of capacities types and configurations shown on schedules. Acceptable manufacturers shall be: Armstrong, Bell and Gossett, Gould or Taco

1. Provided that they meet the requirements of this specification and the performance requirements shown on the schedules (with equal or less horsepower requirement than the pump shown on the schedules). Pumps, other than the scheduled model, may also be rejected, which operate in an inappropriate portion of their performance curves, including but not limited to, operating in the rightmost third of the curve.

2. Pumps shall be designed specifically for intended classes of service, with non-overloading characteristics throughout the design curve (motors shall not operate in their service factor). Impeller shall be statically and dynamically balanced. Impeller size shall be no more than 90 % of casing size. Pump shall be factory tested at operating conditions, thoroughly cleaned, and painted with one coat of machinery enamel prior to shipment. Installation instructions shall be included with pump at time of shipment.

B. Pump Types and Materials of Construction

1. General: For all of pumps, bearing frame and pump internals shall be serviceable without disturbing motor or connected piping. For all pumps, provide mechanical seals with carbon rings and ceramic faces, stainless or brass metal parts, stainless springs and synthetic rubber bellows. Seals shall operate satisfactorily to 225°.

   a. Unless otherwise stated in the schedules, all pumps shall be single stage.
   b. Provide tappings for pressure gauges at inlet and discharge of all in line and split case pumps.

2. In Line Pumps

   a. In Line pumps shall have bronze fitted construction, including cast iron casings, bronze or copper shaft sleeves, alloy steel shafts and bronze impellers. Bearings shall be either be sleeve type or regreasable ball bearings. Provide casing wear rings, drain and vent connections and flexible coupling or direct drive connection between pump and motor. If the scheduled pump includes ball bearings and a direct drive motor to impeller connection, the submitted pump shall not have sleeve bearings or a flexible coupling between pump and motor.

2.11 KITCHEN EXHAUST HOOD

A. General: Provide a baffle filter canopy hood system, wall style, exhaust only with single wall front equal to a Greenheck exhaust hood model GHEW as shown on plans and in accordance with the following specifications.

B. The hood shall have two active sections and shall be of the type I, exhaust only wall canopy suitable for all types of cooking applications. The hood shall be U. L. 710 listed without fire damper for 400°F, 600°F, or 700°F rated cooking appliances.

C. The hood exterior shall be constructed of a minimum of 18 gauge stainless steel with an embossed finish 430 SS with a #4 polished finish where exposed. The hood shall be constructed using the standing seam method for optimum strength. Front panels shall be of single wall construction. An integral 3 inch air space shall be provided to meet NFPA 96 clearance requirements against limited combustible walls. Integral 3 inch air space may be omitted for non-combustible construction. All seams, joints and penetrations of the hood enclosure shall be welded and/or liquid tight. Lighter material gauges, alternate material types and finishes are not acceptable. All unexposed interior surfaces shall be constructed of a minimum 18 gauge corrosion resistant steel including, but not limited to ducts, plenum, and brackets

D. The hood shall include a filter housing constructed of the same material as the hood. The filters shall be aluminum baffle type, U. L. 1046 classified, and in sufficient number and sizes to ensure optimum performance. The filter housing shall terminate in a pitched, full length concealed grease trough which shall drain into a removable grease container.

E. Provide a make-up air plenum with bottom and front air discharges and connections to spread the air evenly over the length of the hood.

F. The hood shall include a performance enhancing lip (PEL) to improve capture efficiency by turning air back into the hood.

G. Vapor proof, U. L. Listed incandescent light fixtures shall be pre-wired to a junction box located at the top of the hood for field connection. Wiring shall conform to the requirements of the national electrical code (NFPA #70 - latest edition).

H. The canopy hood shall be built in accordance with national fire protection association (NFPA) bulletin #96, international mechanical code (IMC), uniform mechanical code (UMC), and bear the national sanitation foundation (NSF) seal of approval. The hood manufacturer shall provide, on request, the necessary data that confirms compliance with the code authorities listed above.

2.12 ANSUL FIRE SUPPRESSION SYSTEM for KITCHEN HOOD

A. General: The hood system shall contain a factory engineered and pre-piped, UL listed, wet chemical, Ansul R-102 restaurant fire suppression system.

1. The system piping shall be installed in the hood at the time of construction above the hood or within the supply plenum, and shall be concealed from view. No exposed piping is acceptable, with the exception of appliance drops.

2. The system shall be capable of automatic detection and actuation and/or remote manual actuation. The system shall have the fire suppression capabilities to protect the ducts, plenums, filter areas and cooking equipment

B. The system shall include all parts to complete the system as well as field installation and certification and coordination with plumbing sub-contractor on controls.

1. Mechanical or electrical gas valves shall be provided as part of this control package for gas line shut-off applications and two (dpdt) double pull double throw microswitches for activation of the shunt trip breaker (provided by others) for electrical equipment.

2. Manufacturer shall provide necessary contacts and accessories for signals for the FA system, the electrical shut down system and the gas valve signal.

3. The system shall also include the release assembly, agent cylinder, agent, detectors, fusible links, liquid tight fittings, remote manual pull station, and schedule 40 black iron pipe with chrome sleeving for exposed areas.

4. A certified local Ansul distributor shall be selected by the factory for final system hook-up.

C. Standard features shall include:

1. UL and ULC listed and shall meet UL 300 requirements.
2. Liquid tight fittings for all hood penetrations where fully welded.
3. Low ph agent.
4. Reliable cartridge activated.
5. Chrome appliance drops.

2.13 KITCHEN HOOD EXHAUST FAN

A. General - Provide a roof mounted exhaust fan equal to model scheduled on plans. Fan shall be a belt driven, backward inclined centrifugal utility type.

1. Submittals - Provide dimensional drawings and product data on fan including fan curve at the specified operation point, with the flow, static pressure and horsepower clearly plotted. Submittal shall include outlet velocity and fan's inlet sound power readings for the eight octave bands, decibels, and sones.

2. Provide manufacturer's installation, operations, and maintenance manual, including instructions on installation, operations, maintenance, pulley adjustment, receiving, handling, storage, safety information and cleaning. A troubleshooting guide, parts list, warranty and electrical wiring diagrams.

3. Performance ratings shall conform to AMCA standard 211 and 311. Fans must be tested in accordance with ANSI/AMCA standard 210-99 and AMCA standard 300-96 in an AMCA accredited laboratory. Fans shall be certified to bear the AMCA label for air and sound performance seal.

a. Fan shall be given a balancing analysis which is applied to wheel at the outside radius. The maximum allowable static and dynamic imbalance is 0.05 ounces (balance grade of g6.3).
b. Comply with the national electrical manufacturers association (NEMA), standards for motors and electrical accessories.

4. Delivery, storage, and handling: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer, material, products included, and location of installation.
   a. Storage: store materials in a dry area indoor, protected from damage, and in accordance with manufacturer's instructions. For long term storage follow manufacturer's installation, operations, and maintenance manual.
   b. Handling: handle and lift fans in accordance with the manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer.

5. Warranty: Submit, for owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under contract documents.
   a. The warranty of this equipment is to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at the manufacturers option when returned to manufacturer, transportation prepaid.
   b. Motor warranty is warranted by the motor manufacturer for a period of one year. Should motors furnished by us prove defective during this period, they should be returned to the nearest authorized motor service station.

6. Maintenance: Refer to manufacturer's installation, operation and maintenance manual (IOM), to find maintenance procedures.

B. Products -
   1. General: Base fan performance at standard conditions (density 0.075 lb/ft3).
      a. Fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number.

   2. Wheel: Shall be Non-overloading, backward inclined centrifugal wheel, constructed of steel and statically and dynamically balanced in accordance to AMCA standard 204-05.
      a. The wheel cone and fan inlet shall be matched and shall have precise running tolerances for maximum performance and operating efficiency.
      b. Single thickness blades shall be securely riveted or welded to a heavy gauge back plate and wheel cone.

   3. Motors shall be permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase and open drip-proof type.

   4. Shafts and bearings: Fan shaft shall be ground and polished solid steel with an anti corrosive coating with permanently sealed bearings or pillow block ball bearings.
      a. Bearing shall be selected for a minimum life in excess of 100,000 hours (equivalent to l50 average life of 500,000 hours), at maximum cataloged operating speed.

5. Housing: Shall be constructed of steel and coated with permatector finish. Discharge position shall be up-blast but shall be easily rotated in the field to any of the eight standard discharge positions.
   a. Housing and bearing supports shall be constructed of welded steel members to prevent vibration and to rigidly support the shaft and bearing assembly balancing up to a minimum of 10 horsepower.

6. Housing supports supports shall be constructed of structural steel with formed flanges and drive frame shall be welded steel which supports the shaft and bearings and reinforcement for the housing and coated with permatector or equal.
   a. Pivoting motor plate with adjusting screws to make belt tensioning operations.
   b. Prepunched mounting holes for installation.

7. Disconnect switches shall be Nema rated 4x, providing positive electrical shut-off and wired from fan motor to junction box.

8. Drive assembly shall include belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower. Belts shall be static free and oil resistant. Pulleys shall be cast type, keyed, and securely attached to wheel and motor shafts.
   a. Motor pulleys shall be adjustable for final system balancing.

C. Options/accessories:

1. Bolted type access door to provide access for inspection and cleaning of wheel.
2. Three-sided fabricated steel belt guard covers drive and motor.
3. 1" threaded connection provided to drain moisture fromed the bottom of the fan.
4. Grease trap constructed of aluminum with drain connection.
5. Heat slinger and shaft seal to dissipates heat along the fan shaft.
   a. Heat slinger shall be an aluminum cooling disc.
   b. Shaft seal shall be aluminum rub ring.
6. Neoprene/rubber mount isolation sized to match the weight of each fan.
7. Weather hood to completely cover motor and drive compartments.
   a. Vented to provide sufficient motor cooling.
   b. Required to meet U.L. 705 and 762 ratings.

D. Execution
1. Comply with manufacturer's product data, including technical bulletins, product catalog installation instructions.
2. Examine areas to receive fans. Notify the engineer of conditions that would adversely affect installation or subsequent utilization and maintenance of fans. Do not proceed with installation until unsatisfactory conditions are corrected.
   a. Ensure duct is plumb, sized correctly, and to proper elevation above roof deck.
3. Install fan system as indicated on the installation, operation and maintenance manual (IOM) and contract drawings and in accordance with manufacturer's instructions.
4. Provide system startup per installation, operation, and maintenance manual (IOM).
   a. Adjust exhaust fan to function properly.
   b. Adjust belt tension.
   c. Lubricate bearings.
   d. Adjust drive for final system balancing.
   e. Check wheel overlap.

5. Cleaning
   a. Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction.
6. Protection
   a. Protect installed product and finished surfaces from damage during construction.
   b. Protect installed exhaust fans to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion.

2.14 KITCHEN HOOD MAKE-UP AIR SYSTEM

A. General unit description – Provide a no cooling, packaged, direct fired, outdoor, heating only, make-up air equal to the scheduled unit designed for indoor or outdoor installation.

1. See electrical sections for the following; not work of this section:
   a. Power supply wiring from power source to power connection on unit. Include starters, disconnects, and required electrical devices, except where specified as furnished, or factory installed, by manufacturer.

2. Equipment shall meet ANSI standards and following references:
   a. Z83.4-1999 - non-recirculating direct gas-fired industrial air heaters.
   b. X3.7-m99 - non-recirculating direct gas-fired industrial air heaters.
   c. NFPA 90a - standard for the installation of air-conditioning and ventilating system.
   d. NFPA 96 - standard for ventilation control and fire protection of commercial cooking operations.
   e. UL-181 - standard for safety factory-made air ducts and connectors.
   f. UL-1995 - standard for safety heating and cooling equipment.

3. Shop drawing and submittals shall include but not be limited to:
   a. Manufacturer's technical product data, including rated capacities of selected model clearly indicated, motor data, fan operating curve, outlet sound power readings for eight octave bands, furnished accessories, installation and start-up instructions.

   b. Manufacturer's shop drawings indicating dimensions, duct connections and corner weights. Drawing views include elevation view, plan view, end view, and footprint view.
   c. Manufacturer's electrical requirements for power supply wiring for units. Submit manufacturer's ladder type wiring diagram for power and control wiring. Factory wiring and field wiring shall be clearly differentiated.
   d. Operation and maintenance manuals for items included under this section.
   e. Warranties covering the items included under this section.

4. Quality assurance shall included but not be limited to firms regularly engaged in manufacture of equipment, of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years
   a. All units shall be tested for proper operation in accordance with etl listing prior to shipping

5. Delivery, storage, and handling shall include but not be limited to the following:

a. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer, material, and products included.
b. Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer's instructions.
c. Handle and lift units in accordance with the manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer. Lift and support the unit with manufacturer's designated lifting or supporting points.

6. Manufacturer's warranty: submit, for owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under contract documents.
   a. The warranty of this equipment is to be free from defects in material and workmanship for a period of one year from the purchase date. Units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid.
   b. Motor warranty is warranted by the motor manufacturer for a period of one year. Should motors furnished by us prove defective during this period, they should be returned to the nearest authorized motor service station.

7. Refer to manufacturer's installation, operation and maintenance manual (IOM) for maintenance procedures

B. Cabinet construction shall be single wall. Exterior panels shall be 18 gauge G-90 galvanized steel using internal frame design. Base rails shall be 12 gauge G-90 galvanized steel. Internal Insulation shall be in accordance with NFPA 90a and tested to meet UL 181 erosion requirements. Unit casing shall be lined with one inch of foil faced fiberglass Insulation.

1. Exterior unit coating – unit shall be protected by G-90 galvanized steel.
   a. Option shall be baked enamel coating that shall meet a minimum 750 hours according to ASTM b117 with a max creep of no more than 1/ 16" from either side of the scribe and with not more than 1/ 8" total maximum.
2. Weatherization: where top panels are joined, there shall be a standing seam for positive weather protection. Metal to metal surfaces exposed to the weather shall be caulked. Access panels shall have door seals
3. Access: components shall be accessible through removable doors
4. Unit arrangement: unit shall be arranged in the horizontal position with a horizontal air discharge.

C. Supply air fan shall be double width, double inlet, forward curved centrifugal fan; statically and dynamically balanced, mounted on ground and polished steel fan shafts with permanently lubricated ball bearings. Bearings shall be selected for a minimum l10 life in excess of 100,000 hours at maximum cataloged speeds
1. Motor shall be permanently lubricated, heavy duty type, matched to the fan load, and shall have be premium efficiency, with ATEFC enclosure. Motor shall be mounted on an adjustable slide base.

2. Drives: V-belt drive sized for a minimum of 150% of driven horsepower. Pulleys shall be cast and have machined surfaces. Motor sheave shall be adjustable.
3. Fan and motor shall be mounted on a common base and internally isolated using neoprene isolators
4. Air flow into the unit shall be 100% outdoor air only.

D. Direct fired burner shall be factory assembled, piped, and wired direct gas-fired system shall be 92% efficient and shall have a draw through design and field adjustable burner baffles with a direct spark ignition system. Sight window for viewing burner operation shall be installed in blower cabinet.
1. Burner: cast aluminum manifold and stainless steel mixing plates. No air from the inside space shall be allowed to pass across the burner at any time. Burner control shall have a digital coded fault indicator capable of storing the last five faults. Flame rectification shall be provided by a flame rod.
2. Fuel shall be natural gas with a maximum rated inlet gas pressure of5 psi. Provide gas pressure regulator as required.

E. Temperature control: temperature control shall be provided by an electronic 25:1 turndown-ratio modulating discharge air sensor. Amplifier to include a low fire time delay potentiometer and sensitivity potentiometer.

F. Safety controls shall include but not be limited to manual reset, high limit switch: main gas valve closes if high-limit temperature is exceeded.
1. Dual safety shutoff valves shall be provided for those that use 120 vac control signals.

G. Weatherhood shall be G-90 galvanized steel housing with 2 inch aluminum mesh filters with optional power inlet damper that shall close upon a loss of power or unit shut down.

H. Electrical controls shall be a kitchen type 24 vac remote control panel with junction box and stainless steel faceplate for flush wall mounting. Wiring from remote control panel to make-up air unit to remote starter control panel to be point to point.
1. Toggle switches shall include:
   a. Fans on/off with single switch for exhaust and supply.
   b. Lights on/off (120 vac).

I. Manufacturer's instructions
1. Compliance: comply with manufacturer's product data, including technical bulletins, product catalog installation instructions.
2. Examine areas to receive make-up air (MUA) units. Notify the engineer of conditions that would adversely affect installation or subsequent utilization and maintenance of MUA units. Do not proceed with installation until unsatisfactory conditions are corrected.
3. Ensure duct is plumb, sized correctly, and to proper elevation above roof deck.
4. Install the MUA unit system according to the installation, operation and maintenance manual (IOM), manufacturer's instructions and contract drawings.
5. Clean as recommended by manufacturer. Do not use material or methods that may damage finish surface or surrounding construction.
6. Protect installed product and finished surfaces from damage during construction. Protect installed make-up air units to ensure that, except for normal weathering, make-up air units will be without damage or deterioration at time of substantial completion.

2.15 HOT WATER COILS

A. Provide hot water coils suitable for duct installation with capacities, pressure drops and leaving air temperatures as shown on Drawings. Acceptable manufacturers shall be Aerofin, Carrier, McQuay, York, or Trane.

B. Coils shall be plate fin type construction providing uniform support for all coil tubes. Coils are to be manufactured with die-formed aluminum or copper fins with self spacing collars which completely cover the entire tube surface.
   1. Coils shall be submerged in water and tested with dry nitrogen to 450 psig at factory before shipment and designed to 250 psig / 300 °F.

C. Tubing shall meet the following parameters:
   1. Tubing and return bends for standard pressure - constructed from UNS12200 seamless copper conforming to ASTM b75 and ASTM b251.
   2. Copper tube temper - light annealed with a maximum grain size of 0.040 mm and a maximum hardness of rockwell 65 on the 15t scale.
   3. Tube expansion - mechanically expanded to form an interference fit with the fin collars without decreasing tube wall thickness.
   4. Minimum thickness: 0.020 inch for 0.625 inch tubing.

D. Casing end and side plates shall be made from one of the following materials:
   1. Copper 0.093 inch thick meeting ASTM b152.
   2. 16 or 14 gauge, G-90 galvanized steel meeting ASTM a653.

E. Sheet metal breaks - bent to 90° +/- 2° unless specified otherwise. Formed tube collars shall be designed so that the expansion surface is 0.100" and the ends are re-flared to prevent raw metal edge from contacting copper tubes.

F. Headers shall be constructed from UNS 12200 seamless copper conforming to ASTM b75, ASTM b88 and ASTM b251 and equipped with factory installed manual air vents and drains placed at the highest and lowest points.

G. Connections shall be of one of the following options:
   1. Male pipe thread (MPT) and constructed from red brass conforming to ASTM b43 or schedule 40 steel.
   2. Male pipe thread (MPT) or female pipe thread (FPT) and constructed from copper.
   3. Sweat connection constructed from UNS 12200 seamless copper conforming to ASTM b75 and ASTM b251.

H. Brazing high temperature filler metals shall be used for all brazed joints. Filler metal shall contain at least 5% silver.

I. Certification - acceptable coils are to have ARI standard 410 certification and bear the ARI symbol.

PART 3- EXECUTION

3.01 GENERAL

A. All equipment shall be installed in accordance with manufacturer's published installation details and instructions and in accordance with best industry standards.

B. All ductwork shall be installed in accordance with latest editions of SMACNA manuals and in accordance with best industry standards

3.02 NEW EQUIPMENT START-UP

A. The mechanical contractor shall employ the services of a qualified representative of the equipment manufacturer, along with any coordination required from the balancing contractor, to start up the new equipment in strict accordance with manufacturer's instructions.

B. Check out all control sensors and devices for the system, including the isolation dampers, temperature controls, and alarm points to ensure that all sequences of operation called for in drawings and specifications operate properly. Ensure that all control components are properly calibrated in accordance with manufacturer's instructions.

3.03 PENETRATIONS AND SLEEVES

A. General ; Provide pipe and duct sleeves and packing materials as specified and as shown on Drawings at penetrations of foundations, walls, slabs (except on-grade), partitions and floors. Sleeves shall meet NFPA-101 requirements and materials requirements of Part 2 of this Section.

1. Coordinate work carefully with architectural and structural work. Set sleeves in forms before concrete is poured. Provide core drilling as necessary if walls are poured, or otherwise constructed, without sleeves and a wall penetration is required. Provide core drilling as required for penetrations of existing construction. Do not penetrate structural members without Designer 's approval.
2. Sleeves for insulated pipe and duct in non-fire rated construction shall accommodate continuous insulation without compression. Sleeves and/or penetrations in fire rated construction shall be packed with fire rated material which shall maintain the fire rating of the wall. Seal ends of penetrations to provide continuous vapor barrier where insulation is interrupted. See Part Two of these specifications for requirements for packing materials.
3. Sleeves through floors shall be water-tight and shall extend 2" above floor surface.

B. Pipe Sleeves

1. Annular space between pipe and sleeve shall be at least 1/4".
2. Sleeves are not required for slabs-on-grade unless specified otherwise.
3. Sleeves and packing materials, through rated fire walls and smoke partitions shall maintain fire rating of construction penetrated.
4. Do not support piping risers on sleeves.

C. Duct Sleeves and Prepared Openings

1. Provide duct sleeves for round ducts 15" and smaller; provide prepared, framed openings for round ducts larger than 15" and for square, rectangular and flat oval ducts, except as specified otherwise. Sleeves shall meet SMACNA requirements.
2. Provide sleeves for ducts through 1-, 2- or 3-hour fire-rated construction and smoke partitions, regardless of size and shape of ducts. Sleeves shall maintain fire rating of construction penetrated. Sleeve and seal materials, construction and clearances shall meet requirements of SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems.
3. Prepared openings shall be framed to provide 1" clearance between framing and duct or duct insulation.

D. Installation Testing, Listings and Approvals

1. Installation shall meet material manufacturer's recommendations exactly, particularly as regards safety, ventilation, removal of foreign materials and other details of installation. Dam openings as recommended. Remove flammable materials used for damming and forming seals in fire-rated construction.
2. Sleeve penetration methods shall be water- and gas-tight and shall meet requirements of ASTM E-119 Standard Methods of Fire Tests of Building Construction and Materials.
3. Fire-stop penetration seal methods and materials shall be FM-approved and UL-listed as applicable.
4. Inspect foamed sealants to ensure manufacturer's optimum cell structure and color ranges.

3.04 ANCHORS AND INSERTS

A. Inserts shall be iron or steel of type to receive machine bolt head or nut after installation. Inserts shall permit adjustment of bolt in one horizontal direction and shall develop strength of bolt when installed in properly cured concrete or in brick construction with expoxy set bolts.

B. Provide anchors as necessary for attachment of equipment supports and hangars.

3.05 INSTALLATION OF EQUIPMENT

A. Avoid interference with structure and with work of other trades, preserving adequate headroom and clearing doors and passageways, to satisfaction of Designer and in accordance with code requirements. Installation shall permit clearance for access to equipment for repair, servicing and replacement.

B. Install equipment so as to properly distribute equipment loads on building structural members provided for equipment support under other Sections.

C. Provide suspended platforms, strap hangers, brackets, shelves, stands or legs as necessary for floor, wall or ceiling mounting of equipment provided under this Section (e.g. heating and ventilating units, fans, ducts and piping.

D. Provide steel supports and hardware for proper installation of hangers, anchors, guides, etc.

E. Provide cuts, weights, and other pertinent data required for proper coordination of equipment support provisions and installation.

F. Structural steel and hardware shall conform to Standard Specifications of ASTM; use of steel and hardware shall conform to requirements of Section Five of Code of Practice of American Institute of Steel Construction.

G. Verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly which will void warrantee. Report in writing to Designer, prior to purchase or shipment of equipment involved, on conditions which may prevent proper installation.

3.06 AIR SYSTEM BALANCING

A. The air balance contractor shall provide qualified personnel, equipment and services for balancing and adjusting of air-side mechanical systems as specified herein. Submit procedures, recording forms, and test equipment calibration documentation for review by engineer at least two weeks prior to scheduled start of balancing procedure.

B. For each system, verify that the installing contractors have completed all mechanical and electrical installation work, cleaning, and pressure testing, before beginning the balancing work

C. For each new item of equipment, verify that the installing contractors have completed all mechanical and electrical installation work, cleaning, and pressure testing, and that the manufacturer's representative has started and tested each unit.

D. Measure and document supply and exhaust air static pressures and air flow rates, minimum outdoor air flow rate, actual fan speed and fan motor amperage. Document all nameplate data for each unit as well.

E. Adjust the supply air flow rate for each make up air unit and each fan individually by adjusting the fan speed via the variable pitch sheave, to obtain the air volumes as indicated on the plans

3.07 TEST, ADJUST AND BALANCE (TAB) REPORTS

A. TAB reports shall include as a minimum, full nameplate data for each item of equipment balanced, including motor data, belt drive information, and operating limits. Verify that each motor matches the scheduled data.

B. Record all measurements taken, and all adjustments made to arrive at final values. Reference all air and/or water flow rates, static pressure, and differential pressure values to specific terminals or loads, and coordinate with locations on drawings which are specified to accompany the report.

C. TAB reports shall be signed and certified by the responsible balancing technician, and six copies shall be submitted to the engineer for approval within two weeks of the completion of work.

END - SECTION 15600

SECTION 16000 ELECTRICAL

PART 1 - GENERAL

PART 2 - PRODUCTS

PART 3 - INSTALLATION

SECTION 16000

ELECTRICAL

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install the materials and components required to complete the work, as shown on the Contract Drawings and specified herein, including, but not limited to, the following items:

1. Demolition of electrical devices, fixtures, and wiring while maintaining services to areas outside the scope of work.
2. Provide new electrical devices, fixtures, and wiring as required to install complete systems as intended by the scope of work.
3. Coordination and cooperation.
4. Record Drawings clearly and accurately illustrating device circuit numbers or address number.
5. Protection of existing utilities.
6. Guarantees and warranties.
7. Permits and fees.

B. Contractor shall furnish, install and maintain, in safe adequate condition, all rigging, staging and scaffolding that are necessary for the proper execution of this work.

C. Contractor shall coordinate all cutting, coring and channeling required with others.

D. The following general systems and equipment shall be provided for the renovated areas of the existing building, as a minimum but not necessarily limited to the following:

1. Normal distribution system.
2. Grounding.
3. Interior lighting fixtures including lamps.
4. Connections to HVAC, Plumbing and Fire Protection.
5. Empty conduits and cabling for voice/data. New voice / data cabling supplied / installed by the Owner.
6. 120V power for remote alarms, other gas alarms.
7. Hoisting, rigging, setting of all conduit, cable and equipment.
8. Testing, cleaning and adjusting.

9. Startup, Demonstration, and Training.
10. Fees, permits and guarantees.
11. Firestopping, smokeproofing and waterproofing.
12. Shop drawings. Coordination drawings. Record Drawings.
13. Addressable ADA compliant fire alarm devices.
14. Services and connections to Owner furnished equipment.
15. Access doors.
16. Panelboards.
17. Raceways and Boxes.
18. Wiring Devices.
19. Identification and Labeling.
20. Conductors and Cable.
21. Disconnect Switches and Circuit Breakers.
22. Hangers, supports and Seismic Restraints.
23. Complete electrical demolition.
24. Mechanical suspension channel.
25. Motor controllers-magnetic starters.
26. Motor disconnect devices.
27. Panelboards-lighting and power.
28. Surface mounted raceway.
29. Relay and low tension cabinets.
30. Wiring devices and device plates.
31. Submittals and approvals of all State and Local Authorities.
32. Dimmers.
33. Specialty equipment drawings furnished by manufacturer.

1.02 RELATED WORK

A. The following related work shall be performed under this contract:

1. Connection of mechanicals equipment.

2. Fire System testing and approval as required by NFPA, WFD and Engineer.

3. Except as specified herein, cutting shall be the responsibility of the General Contractor and patching shall be performed by trades specializing in the specific surfaces affected, i.e. masonry, metals, etc.

1.03 INTENT

A. All work shall be in accordance with the arrangement, details and locations, as indicated on the Contract Drawings, Reference Drawings and any supplemental addenda, bulletins or drawings issued by the Engineer. Layouts are diagrammatic and final arrangement of equipment shall suit field conditions. Install all necessary fittings and equipment offsets required to meet job conditions. The Drawings are not intended to be scaled, but shall be followed with sufficient accuracy to coordinate with other work and structural limitations. Work installed in a manner contrary to that shown on the Drawings, or interfering with the systems of another trade, shall be removed and reinstalled when so directed by the Engineer. Discrepancies and questionable points shall be immediately reported to the Owner and Engineer for clarification, and for direction as to how to further proceed.

1.04 DEFINITIONS

A. Words in the singular shall also mean and include the plural, wherever the context so indicates and words in the plural shall mean the singular, wherever the context so indicates.

B. Wherever the terms "shown on drawings" are used in the specifications, they shall mean "noted", "indicated", "scheduled", "detailed", or any other diagrammatic or written reference made on the drawings.

C. Wherever the term "provide" is used in the specifications it will mean "furnish" and "install", "connect", "apply", "erect", "construct", or similar terms, unless otherwise indicated in the specifications.

D. Wherever the term "material" is used in the specifications it will mean any "product", "equipment", "device", "assembly", or "item" required under the Contract, as indicated by trade or brand name, manufacturer's name, standard specification reference or other description.

E. The terms "approved", or "approval" shall mean the written approval of the Owner and Engineer, and/or the authorities having jurisdiction, as the context applies. These terms shall not relieve The Contractor from the requirements of the contract documents.

F. The term "specification" shall mean all information contained in the bound or unbound volume, including all "Contract Documents" defined therein, including all drawings.

G. The terms "directed", "required", "permitted", "ordered", "designated", "prescribed" and similar words shall mean the direction, requirement, permission, order, designation or prescription of the Owner and Architect. The terms "approved", "acceptable", "satisfactory" and similar words shall mean approved by, acceptable or satisfactory to the Owner, Engineer, or authority having jurisdiction. The terms "necessary", "responsible", "proper", "correct" and similar words shall mean necessary, reasonable, proper or correct in the judgment of the Owner and Engineer.

H. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, embedded in construction or in crawl spaces.

I. "Exposed" means not installed underground or "concealed" as defined above.

J. "Center Line Elevation" means the elevation to the centerline of pipe.

K. "Electrical Contractor" refers to the Contractor, Subcontractor or his Contractors responsible for furnishing and installation of all work indicated in the Electrical Specifications and as shown on the Electrical Drawings. The terms "Electrical Subcontractor", "Subcontractor" and similar terms shall mean "Electrical Contractor" as defined above.

L. "Working Plans" are fabrication drawings provided to indicate actual sprinkler system and/or combination system piping layout.

M. "Contract Documents" shall mean the documents prepared for this project for the electrical systems as well as all other trades, in specification and/or drawing format.

N. "Owner" shall mean Waltham High School and its representatives and agents, including but not limited to School Board, and/or City Facilities.

O. "Engineer" shall mean Patrick Engineering Inc.179 South Street, Boston, Massachusetts, 02111.

1.05 CODES, REGULATIONS AND STANDARDS

A. All work shall be installed in conformance to the governing Codes, Regulations and Ordinances. It shall be the responsibility of Contractor to familiarize himself with all governing Codes, Regulations and Ordinances and report any non-compliance of the Plans and Specifications to the Owner and Engineer, prior to entering into a contract. All the preceding requirements shall take precedence over the Plans and Specifications. These requirements are minimum criteria and no reductions permitted by Code will be allowed.

B. All workmanship, methods and materials shall meet the highest standards of the trade and, in general, shall conform to the standards of the following associations:

BOCA Building Officials and Code Administrators

ASME American Society of Mechanical Engineers

IEEE	Institute of Electrical and Electronic Engineers
NFPA	National Fire Protection Association
NEMA	National Electrical Manufacturers Association.
EIA/TIA	Electronics Industry Association/Telecommunications Industry Association
IES	Illuminating Engineering Society.
OSHA	Occupational Safety and Health Act.
FM	Factory Mutual
UL	Underwriters' Laboratories
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
USDHHS	United States Department of Health and Human Services.
MSBC	Massachusetts State Building Code.

1.06 DRAWINGS AND CONFLICTS IN THE WORK

A. The Drawings and Specifications are intended to be complementary. Any materials shown or specified in one, but not in the other, reasonably implied and usually included under good industry practice and/or required by applicable Codes and Regulations for the proper and safe completion and operation of the work described herein, shall be furnished and installed by Contractor at no additional cost to the Owner. Drawings show general arrangement of equipment and are not intended to indicate the exact dimensions of runs.

B. The drawings are intended to show the design concept. Every attempt has been made to fully detail all conditions which shall occur. The drawings contain details, sections, enlarged plans, etc., that must referred to prior to installing any work. Installation of work not in compliance with these detailed drawings shall be removed and installed correctly at Contractor's expense, with no extension of time.

1.07 WORKMANSHIP

A. The entire work provided in this Specification shall be constructed and finished, in every respect, in a workmanlike and substantial manner. It is not intended that the Drawings shall show every detail, but Contractor shall furnish and install all such parts as may be necessary to complete the work in accordance with the best trade practice and to the satisfaction of the Engineer and the Owner. The Owner shall have the right

to reject any part of the work in case the workmanship is not of satisfactory quality and Contractor shall replace same with acceptable work at his own expense.

1.08 PERMITS AND INSPECTIONS

A. Contractor shall obtain, and pay for, all the permits, required to be issued by applicable governing authorities, for this Section of the work. He shall also obtain and pay for all the inspections and tests required. Defects discovered in work, materials and/or equipment shall be replaced at no cost to the Owner, and the inspection and test shall be repeated to the Engineer's and Owner's satisfaction. When work is completed, Contractor shall furnish a Certificate of Inspection and Approval to the Owner before final payment of the Contract will be allowed.

B. Contractor shall obtain information, specifications, approved manufacturers, and details concerning any local construction and materials standards which might be set forth by applicable governing authorities, and work under this contract shall conform to such standards. Contractor shall coordinate with City of Waltham Fire Department, Building Department, Public Works Department, and all other agencies which set forth jurisdiction and/or standards pertaining to the work of this contract.

1.09 GUARANTEE

A. Unless otherwise noted, all materials, items of equipment and workmanship furnished under this Section shall carry the standard warranty against all defects in material and workmanship for a period of not less than the time period specified in the forms, from the date of substantial completion of the work. Any fault due to defective or improper material or workmanship which may develop within that period, shall be made good, forthwith, by and at the expense of Contractor, including all other damage done to areas, materials and other systems resulting from this failure.

B. Contractor shall guarantee that all elements of the Systems are of sufficient capacity to meet the specified performance requirements as set forth herein or as indicated.

C. Upon receipt of notice from the Owner of failure of any part of the Systems during the guarantee period, the affected part or parts shall be promptly replaced by Contractor at no charge to the owner.

D. Contractor shall furnish, before the final payment is made, a written guarantee covering the above requirements.

1.10 MATERIALS

A. Materials shall be the best of their respective kinds and in full accord with the most modern mechanical construction. All materials shall be new.

B. All materials necessary to make the installation complete in every detail shall be furnished and installed under this Contract, whether or not specifically shown on the Drawings or specified herein.

C. It is the intent of the Specifications that one manufacturer be selected, not a combination, for any particular classification of materials.

D. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish the standard of desired quality and style and shall be the basis of the bid.

1.11 MATERIALS AND EQUIPMENT HANDLING

A. Contractor shall do all handling of his materials and equipment and the resulting cleanup, at his expense, in a safe and satisfactory manner. Special attention shall be paid to the protection of life and property and the equipment or apparatus handled, and any corresponding damages shall be replaced, repaired or paid for by Contractor, as approved by the Engineer. Contractor shall provide all rigging and hoisting required to complete the work of this Section, unless specifically noted otherwise.

1.12 MAINTENANCE AND PROTECTION OF MATERIALS

A. Contractor shall be responsible for the maintenance and protection, from loss or damage of all causes, of all equipment, materials and tools supplied by him and stored or installed on the job site, until final acceptance of the project by the Owner.

B. Contractor shall store his materials and equipment in the location designated by the Owner and maintain the storage area in a safe condition.

C. Contractor shall clean, patch and repair any material and finish of the building or its contents damaged during the execution of this Contract.

1.13 SHOP DRAWING AND MATERIAL SUBMITTALS

A. Submit complete Shop Drawings.

B. Before purchasing any materials or equipment, submit to the Owner and Engineer for approval, complete Shop Drawings of all equipment and materials. Do not order any material or equipment until approval has been obtained from the Engineer.

C. The approval of equipment and materials does not relieve Contractor from the responsibility of Shop Drawing errors in details, sizes, quantities and dimensions which deviate from the Specifications, Contract Drawings and/or job conditions as they exist.

D. If apparatus or materials are substituted by Contractor for those specified, and such substitution necessitates changes in any mechanical equipment, or alteration to connections, piping, supports, or construction, same shall be provided. Contractor

shall assume the cost and entire responsibility thereof. The Owner's and Engineer's permission to make such a substitution shall not relieve Contractor from full responsibility for the work.

E. Changes to work already performed, made necessary by delays in Shop Drawing approvals, are the responsibility of Contractor.

1.14 RECORD DRAWINGS

A. Submit, in AutoCAD 2010 format, Record Drawings, which shall clearly and accurately indicate the actual installation of the work. Include changes in sizes, and grade all pipes, valves, junctions, connections and ends. Submittal shall be made to the owner and engineer.

1.15 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Provide operating instructions and maintenance manuals to the Owner's designated representative, with respect to operating and maintenance procedures, for all equipment and systems installed. The cost of such instruction, up to a full eight (8) hours, shall be included in the Contract price. Include Guarantees on all equipment, Preventive maintenance instructions for all Systems, and Spare parts list of all System components.

B. Each manual shall be typewritten and bound under a separate hard cover 3-ring binder and will be reviewed by the Engineer. The manuals shall be clearly and permanently identified on the cover with the name of the project and trade involved.

1.16 TEMPORARY STRUCTURES

A. Not required.

1.17 TEMPORARY SERVICES

A. Contractor shall furnish all electricity and fire detection required for safe and efficient construction during normal working hours.

1.18 TESTS

A. Furnish all labor, materials, instruments, supplies and services and bear all cost for the accomplishment of the tests herein specified. Correct all defects appearing under test, repeat the tests until no defects are disclosed and leave the equipment clean and ready for use.

B. Perform any tests, other than herein specified, which may be required by legal authorities or by agencies to whose requirements this work is to conform.

C. Dispose of test water and wastes after tests are complete, in a manner satisfactory to all authorities.

1.19 EQUIPMENT ACCESS REQUIREMENTS

A. All work shall be installed so that all parts requiring inspection, operation, maintenance and repair are readily accessible. Minor deviations from the Drawings may be made to accomplish this, but changes of magnitude shall not be made prior to written direction from the Engineer.

END OF SECTION

PART 2 - PRODUCTS

2.01 GENERAL

A. Materials and equipment included under this part and required for proper operation of the electrical system shall comply with the applicable requirements of Part 1 of this specification.

2.02 RACEWAYS AND FITTINGS

A. Electrical metallic tubing shall be zinc coated, enamel lined, threadless thin wall steel tubing. Metal clad cable and armored cable shall have full size ground and be approved for hospital applications.

1. No raceway shall be used smaller than 3/4" diameter. No conduit shall have more than four (4) 90 bends in any one run, and where necessary, pull boxes shall be provided. Intermediate metal conduit is not allowed.

2. Rigid metal conduit conforming to, and installed in accordance with, Article 346 shall be heavy wall coated steel conforming to American Standard Specifications C80-1 and shall be used for service work, exterior work, slab work, and below grade level slab, wet locations and also where raceway may be subject to mechanical damage.

3. Rigid non-metallic conduit may be used at the Contractor's option for underground raceways outside the foundation wall and shall be polyvinyl chloride (PVC) schedule 80, 90 C.

4. Acceptable manufacturers:

5. Pittsburgh Standard Conduit Company

6. Republic Steel and Tube

7. Youngstown Sheet Tube Company

8. Carlon

9. Fittings:

   a. Provide insulated bushings on all raceways 1 inch diameter or larger.

   b. Manufacturer's standard fittings shall be used for raceway supports.

c. Expansion Fittings: Expansion fittings shall be used where structural and concrete expansion joints shall occur and shall include a bonding strap, if applicable.

d. Couplings for rigid metal conduit shall be threaded type.

e. Wall entrance seals shall be equal to O.Z. Gedney type "WSK".

f. Couplings, elbows and other fittings used with rigid non-metallic raceways shall be of the solvent cemented type to secure a waterproof installation.

g. Acceptable manufacturers:

O.Z.

Crouse Hinds

Appleton

EFCOR

Steel City

B. In-Floor Raceways

1. In-floor, surface, and flush raceway and fittings shall compromise a complete system as required by the project scope of work. Components shall be U.L. listed for the application.

2. Covers shall be removable screw-type rated for floor loads as applicable. Cover length shall not exceed two feet.

3. Partitions shall be installed to maintain separation of cable groups.

2.03 CONDUCTORS

A. Conductors, 600 V or Less

1. All conductors shall be stranded except as noted for grounding conductors. Conductors in raceways shall be a minimum of No. 12 copper, 75°C insulation, 600V type then unless otherwise noted.

2. Feeder conductors shall be type XHHW, copper, 600V, 75°c insulation.

3. Control conductors shall be no. 14 copper wire with 600V insulation.

4. Grounding conductors shall be copper wire with green color insulation, no, 4 and larger may have green tape. All grounding conductors shall be sized in accordance with the MEC250.

2.04 BOXES AND COVERS

A. Pull and Junction Boxes

1. Boxes shall be of code gauge galvanized steel with screw covers. Provide special box sizes and shapes as required.

2. Cables and/or conductors passing through pull boxes shall be identified to indicate their origin and termination.

3. Boxes exposed to hosedown, hose spray (sprinkler) or similar pressurized water environments shall be watertight NEMA 4.

4. Boxes exposed to rain or in wet locations shall be NEMA 3R.

5. Boxes used with aluminum conduit shall be made of metal compatible with aluminum.

6. Each box, including boxes above switchboards, MCC's and large panel boards shall be provided with clamps, grids, and other appurtenances, to which cables shall be secured in neat and orderly fashion permitting ready identification; no cable shall be unsupported for more than 30in.

7. No pull box shall be located within 2 ft of another pull box.

8. Boxes where flammable gases or vapors may be present shall be provided with sealing fittings or other approved means by U.L, F.M. or N.E.C. to prevent transmission of such gases or vapors through conduits.

9. Boxes connected to concealed conduits shall be mounted with covers flush with finished wall or ceiling. No aluminum boxes shall be embedded in concrete.

10. Boxes that are not specifically shown on the drawings but are required for the proper installation of the electrical system shall be provided by the Contractor so that they do not interfere with the structural or architectural features of the building.

11. Pull boxes of other than standard manufacturer's trade size shall be manufactured by Keystone, Hubbell, Commercial Steel Metal, or approved equal.

B. Outlet Boxes and Covers

1. Outlet boxes shall be hot-dipped galvanized or sheradized steel. Outlet boxes for weatherproof concealed work and for exposed conduit work shall be cast or malleable iron conduit fittings. Outlet boxes shall be concealed except as noted.

Waterproof boxes shall be concealed except as noted. Waterproof boxes shall be Condulet Cast Boxes with waterproof devices and covers. The Contractor shall provide hot dip galvanized corro-free epoxy finish or PVC coated products where noted on drawings.

2. Exposed cast boxes shall have mounting feet for surface mounting.

3. Exposed outlet boxes shall have threaded conduit hubs. Outlets in special occupancies shall be as required by the location

4. Fixture outlet boxes shall have 3/8in. solid male fixture studs and auxiliary fixture stems shall be supported from 3/8 in. male fixtures studs.

5. Raised covers in finished tile, cinder block, or similar masonry construction where no other finish is to be applied shall have 90 deg corners and edges. Boxes in plaster finish shall have raised plaster covers with rounded edges and corners.

6. The Contractor shall provide screw-joint outlet boxes with gasketed weatherproof covers in exterior locations, where exposed to moisture, and where shown on Drawings. Receptacle covers shall be Crouse-Hinds WLRS or WLRD.

7. The minimum size outlet for light fixtures shall be 4 in. octagonal 2-1/8 in. deep, except in concrete 2-1/2 in. deep. Concealed switch and receptacle boxes shall be a minimum 4 in. sq. 1 1/2in. deep with extension cover, except with 1 in. conduit 4-11/16 in. boxes shall be provided. Through wall boxes shall not be used, outlet boxes shall not be mounted back to back but shall be staggered.

8. Floor outlets shall be adjustable, watertight, single or multi-outlet as required, complete with a proper cover plate to accommodate the device indicated on the drawings. Cover plate and rings shall be suitable for the type of floor finish including tile, wood, or carpet, and shall be finished in bronze or aluminum as directed.

9. Provide only enough conduit openings to accommodate the conduits actually provided at each individual location. Each box shall be large enough to accommodate number and sized of conduits, wires and splices in accordance with NEC requirements, but shall be no smaller than the size shown or specified. Box depths greater than 2-1/8 in. shall not be used generally for obtaining necessary volume, but may be used with the Engineers' approval to facilitate installation. Standard concrete boxes may be 6-in. deep where necessary to permit entrance of conduits into sides of boxes without interference with reinforcing bars. Octagonal hung ceiling boxes with suspension bars may be 3-1/2 in. deep. Rectangular boxes for interconnection of branch circuit conduits may be 2-1/2in. deep.

10. Boxes shall be manufactured by Steel City, Russell/Stoll, Crouse-Hinds, Appleton, or Carlon.

11. Furnish and install all required outlet boxes at the approximate locations as shown on drawings. Outlet boxes shall be of a size and type to accommodate (1)

structural conditions, (2) the size and number of raceways, conductors or cables entering and (3) the devices or fixtures for which the boxes are required.

12. Outlet boxes used at fixture locations shall have a suitable fixture stud provided in the box for support of an incandescent fixture and a special support independent of an in addition to the fixture stud for support of a fluorescent or HID fixture.

13. Outlet boxes for exposed conduit work shall be hot dipped galvanized or cast aluminum alloy with covers of like composition.

14. Boxes exposed to the weather or moisture conditions shall contain a rubber or neoprene gasket; switch covers for exposed outlet boxes shall be of the protective guard type.

15. Outlet boxes shall be provided with the proper size knockouts for the conduits used. All unused knockouts shall remain closed or shall be sealed with knockout closures.

16. Device or utility boxes shall be of unit construction of a size required for the number of switches or outlets called for on the drawings.

17. Surface mounted outlet boxes for receptacles, switches, etc. located in industrial areas shall be cast type.

C. Cover Plates

1. Device plates for switches, receptacles and miscellaneous outlets shall be non magnetic stainless type 302. Finish as directed by architect AH-93000 or equal.

2. Cover plates for industrial type area where cast boxes are used shall be matching cast covers, Crouse Hinds Catalog No. DS32G, etc, or approved equal; where steel boxes are used, cover plates shall be sheet steel, Crouse Hinds Catalog No, DS23, DS32, etc. or approved equal.

D. Multi-Outlet Assemblies

1. Fixed multi-outlet assemblies shall consist of surface metal raceway as shown on the drawings with minimum dimensions of 2-3/4in. wide by 1-17/32 in. deep and specification grade duplex receptacles spaces as indicated on the drawings. Receptacles shall meet specified voltage/phase amperage requirements and Subsection 2.5 – Wiring Devices. Phase and neutral conductors shall be at least No. 12 AWG (larger if required by NEC derating considerations) and shall have type of insulation specified for branch circuit conductors. Separate neutral conductors shall be provided unless otherwise noted on the project drawings. The assemblies shall include No. 12 AWG or larger green insulated equipment grounding conductor(s) with same insulation as phase conductors. The grounding conductor shall be connected to receptacle equipment grounding system. This ground conductor is not normally shown on the drawings. Where

more than one circuit serves several similar receptacles in a common raceway, do not connect adjacent receptacles to same circuit.

2. The Contractor shall provide snap-on blank covers or snap-on receptacle covers or both to suit the receptacles furnished. The covers shall be by the raceway manufacturer, and shall be installed so that there will be no open cracks. Where industry standard device plates are installed on raceway, snap-on blank covers shall be accurately cut to avoid open cracks and the finish on divided plates shall be painted to match the raceway finish.

3. Provide suitable fittings elbows, clips mounting straps, connection blocks, insulators, etc. as required. Provide rigid concealed conduit ½ in. minimum size, to interconnect raceway sections that are not continuous. Raceways shall be adequately bonded to the metallic conduit system. Raceways and covers shall have (neutral gray) (buff) standard factory finish, unless otherwise stated.

4. Multi-outlet assemblies shall be by Wiremold (or approved equal) series as indicated on the project drawings.

E. Terminal Boxes

1. Terminal boxes shall be provided with removable panel(s) for mounting relays, wiring devices, and terminal blocks. Terminal boxes shall be Hoffman NEMA 1, 3R, 4, 4X or 12 enclosures, depending upon location or approved equal.

2.05 WIRING DEVICES

A. Wiring devices type and grade shall be as indicated in legend or on the drawings. Color as directed by architect.

2.06 PANELBOARDS

A. Lighting and low voltage panelboards for operation on 208Y/120 shall be of the dead front, safety type. Panelboards shall be provided with the type, number and size of branch circuit breakers as indicated on the drawings. Panelboards shall have a fully rated isolated neutral bus and shall also have an equipment ground bus. The Contractor shall verify the frame sizes and trip ratings of breakers shown on the drawings.

B. Panelboard main bus ampere rating shall be as indicated on the drawings and equal to or greater than the ampere rating of the feeder breaker or disconnect switch supplying that panelboard.

C. Panelboards shall have integrated short circuit current ratings equal to or greater than circuit breaker IC ratings shown on panelboard schedule. Test in accordance with UL 67.

D. Two and three-pole breakers shall have internal common trip so that an overload on one pole will trip all poles simultaneously. All circuit breakers with frame sizes larger than 100 amp rating shall have interchangeable trips. "Common trip" handle bar ties will be allowed on "Q-line" multipole circuit breakers to accomplish manual tripping.

E. Circuit breakers which will switch lighting circuits shall be UL listed as SWD type switching duty. Such circuit breakers, if used for this application, are identified on the drawings.

F. Ground fault protection circuit breakers shall be provided as shown. GFI circuit breakers shall have frequency suppression circuitry to prevent false tripping. A separate neutral to load neutral conductor shall be provided by the Contractor for each GFI circuit breaker - common neutrals shall not be used.

G. Circuit breakers shall have bolted bus connections. Plug-in circuit breakers shall not be used.

H. Main bus shall be copper bars with compression lugs to accommodate feeder cables shown.

I. All interiors shall be completely factory assembled with switching and protective devices, wire connector, etc. All wire connectors, except screw terminals, shall be of the anti-turn solderless type and shall be suitable for copper wire of the sizes to be connected in each panelboard.

J. Interiors shall be so designed that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors and shall be so designed that circuits may be changed without machining drilling or tapping.

K. A manufacturer's nameplate shall be provided listing panel type and ratings.

L. Boxes shall be made from galvanized code gauge steel having multiple knockouts except where noted. Boxes shall be of sufficient sizes to provide a minimum gutter space of 4 inches on all sides, or more if required by the NEC.

M. Doors in panelboard trims shall conform to the following:

N. In making switching device handles accessible, doors shall not uncover any live parts.

O. Doors shall have flush-type cylinder lock and catch. All panelboards shall be keyed alike.

P. Directory frame and card having a transparent cover shall be furnished on each door.

Q. Panelboard trims shall be "door-in-door" type, with a full-length piano hinge arranged so that the trim will swing at least 180 degrees to facilitate internal wiring of the panelboard. Latching of the hinged trim shall be accomplished by means of captive screws at both corners of the non-hinged side.

R. Feed-through bus panel shall not be supplied.

S. The Contractor shall provide a rivet or screw mounted nameplate on each trim above the door in accordance with Subsection 3.1.

T. Panelboards, cabinets and trims shall be manufactured by Eaton/Cutler-Hammer.

U. Where two section panels are required, boxes for individual sections shall be bolted together to form one unit. The panelboard trim for panels of this type shall be of two piece construction with doors over each section of equal size.

2.07 LIGHTING

A. Luminaries

1. Lighting fixtures shall be by the manufacturers specified or as otherwise determined by the Engineers. Because the lighting design is based upon manufacturers' photometric, substitutions shall not be permitted unless specifically stated in the lighting fixture schedule.

2. Ballasts for each fixture type (A, B, C, etc.) shall be of one manufacturer; General Electrical, Advance, Universal, or equal. Ballasts for fluorescent lamps shall be electronic low energy and low THD type.

3. Ballasts shall be designed, manufactured, and tested to meet the latest industry standards and this requirement shall be certified by an independent testing organization. Ballasts shall carry UL and CBM emblems, where applicable.

4. All ballasts shall be high power factor, 0.9 PF minimum, designed for the voltage at the fixture. Ballast case temperature shall not exceed 90ºC. Ballasts for exterior fixtures shall start lamps at -20ºF.

5. Ballasts for fluorescent fixtures shall be UL Class P, shall incorporates automatic resetting protection, and shall be classified for quiet operation: "A" sound rating, 430 ma; "B" 800 ma; "C"1500 ma.

6. Fixtures shall be complete with all accessories such as close nipples, extension couplings, connecting straps, screws, locknuts, hickies, plaster rings, to provide complete fixture installation for use with any type of standard outlet or switch box., Plaster frames shall be provided where required because of the ceiling construction.

B. Lamps

1. Lamps of the correct wattage, type and color shall be provided in the necessary quantity to completely lamp every fixture.

2. Incandescent lamps installed in permanent lighting fixtures and used for lighting during construction shall be replaced on or just before the date of Substantial completion.

3. (Incandescent lamps for general use shall be inside frosted, medium base, long life.) (Incandescent lamps for general use shall be inside frosted, medium base, "watt-miser" low energy, long life.)

4. Lamps shall be by General Electric, North American Philips, or Sylvania. Rapid start lamps shall be as stated in the lighting fixture schedule.

5. Fluorescent and HID lamps shall be operated for an initial "burn-in period" of at least 100 hr. prior to the final inspection. All lamps shall be furnished and installed by the Contractor. Incandescent lamps for connection to 120v circuits shall be specifically rated for 125V unless otherwise specified. Fluorescent lamps shall be warm white unless otherwise specified. Mercury lamps shall be deluxe white. High-pressure sodium and metal halide lamps shall be clear for all applications unless otherwise specified on the drawings.

C. Dimming Systems

1. General

a. The Contractor shall provide complete UL listed incandescent, fluorescent, and HID dimming systems as shown on the drawings.

b. Individual incandescent and fluorescent dimming controls shall be Lutron NOVA linear slide controls or approved equal. Dimming control faceplates shall be engraved by the manufacturer as directed by the Engineers. Faceplates shall be (white) (beige) (brown).

2. Incandescent Dimming Systems

a. Incandescent dimming systems shall be Lutron High Power Incandescent Dimming Systems or approved equal; complete with NOVA manual lighting control stations, motorized controls, momentary remote control stations, NOVA master control stations, and Model DA lighting controllers.

3. Fluorescent Dimming Systems

a. Fluorescent dimming systems shall consist of specification grade manual intensity selector controls, solid-state power sections, and dimming ballasts. Circuit wiring shall be shielded to minimize interference to instrumentation.

b. Dimming ballasts shall be specified at the time the fixtures are ordered. The dimming ballasts shall be of the manufacturer and type required by the dimming system manufacturer in order to maintain his UL listing. All ballasts and lamps shall be identical. Lamps shall be as recommended by the dimming system manufacturer for optimum dimming system performance.

c. The fluorescent dimming system shall utilize UL-listed Lutron Model FD, and FC components, with RF noise suppression, or Engineers' approved equal.

d. Automatic fluorescent energy management dimming systems shall be Lutron Paesar PRF Systems, Hi_Lume Systems, or approved equal. The system configuration shall be as shown on the drawings, and system operation shall be as follows.

2.08 MISCELLANEOUS AND LOW VOLTAGE DRY TYPE TRANSFORMERS

A. Signal Transformers (Under 50 Volts) T

1. Transformers shall be in accordance with the current version of ANSI/NEMA ST-1.

2. Transformers for signaling or low voltage control circuits shall have characteristics, and be of the size required for the equipment and load which is supplied.

3. Minimum rating shall be 50 watts.

4. Transformers shall be heavy-duty type mounted in flush or surface cabinet with louvered hinged door and secondary fuses. Transformers shall be UL-listed Edwards Series 7850, General Electric, or Eaton/Cutler-Hammer or approved equal.

2.09 GROUNDING

A. Equipment Grounding Conductors

1. Equipment grounding conductors shall be provided for all power systems as required elsewhere by this project specification.

2.10 DISCONNECT SWITCHES AND FUSES

A. Disconnect Switches

1. The Contractor shall provide disconnect switches as shown on the drawings and as required. Disconnect switches shall have an i^2t rating which shall not be exceeded. All motors shall have disconnect switches, whether or not the disconnect switches are shown on the drawings.

2. Disconnect switches shall be fused or unfused as shown on the drawings, type HF or HU, NEMA heavy duty, with interlocking cover, insulated handle, side operated, General Electric, Square D, or Eaton/Cultler-Hammer. The interlocking

cover mechanism shall be capable of being defeated when necessary. Elevator disconnect switches shall be fused.

3. Switches shall be rated 600 V DC.

4. The switch shall be quick-make quick-break mechanism mounted insulating base, parts replaced from front, contacts silver-tungsten or silver plated fuse clips positive pressure type designed to accommodate UL Class J, L, or RK5 fuses.

5. Enclosures shall be NEMA 1 for indoor use. Enclosures exposed to weather or rain conditions shall be NEMA (3) (3R). Enclosures shall have provisions to padlock handle in off position and cover in closed position. Enclosures in corrosive environments shall be NEMA 4X.

6. Verify motor horsepowers and voltage with the Purchaser, Engineers and other Sections before purchasing switches.

B. Fuses

1. Fuses shall be non-renewable current limiting. Fuses shall be UL Class J and L, except fuses for motors shall be dual element UL Class RK5. All fuse contact surfaces shall be silver plated.

2. The combination switch and fuse shall have a short circuit interrupting rating equal to a minimum of 200 kA.

3. Fuses for motors in disconnect switches shall be Gould Shawmut, time delay RKS Tri-Onic dual element, Bussmann or Equal.

4. Fuses for ballast protection shall be sized as recommended by the ballast manufacturer, and shall be similar to Bussmann Type GLR quick-blow, Gould Shawmut or approved equal.

2.11 MOTOR CONNECTIONS AND CONTROLS

A. The Contractor shall provide motor starters and remote controls and shall wire and connect all motors, motor starters and starter actuating equipment as shown on the electrical drawings.

B. All motor starters shall be by one manufacturer: General Electric, Eaton/Cutler-Hammer, Arrow-Hart, Allen Bradley, or Square D. Starter shop drawings shall be submitted for review and shall include heater tables and time current curves of heaters.

C. Motors ½ horsepower (HP) and larger shall be 200V, three phase, 60 Hz; motors less than ½ HP shall be 115V single phase, 60 Hz. Refer to the drawings for power supply voltage.

D. The Contractor shall, under this Section, verify the motor voltage for each motor with Purchaser, Engineers and those performing the work of other Sections of the specification before motors are purchased.

E. The Contractor shall, under this Section, verify the motor horsepower for each motor with those performing the work of other sections of the specification and with the Engineers before the starters are purchased.

F. Before ordering starters and/or submitting shop drawings the Contractor shall review all motors provided under other sections to determine that all other special requirements, specifically:

1. Reduced voltage starters

2. Two speed starters

3. Reversing starters

G. Special local/remote control interface requirements have been incorporated into the starters. The Contractor's failure to perform this coordination shall not relieve him of his responsibility to provide the proper type of starter and the Contractor shall be responsible for any replacement and restocking charges.

H. All starters and controls shall conform to application UL and NEMA Industrial Control Standards and shall be provided with NEMA-1 enclosures, except that the Contractor shall provide other type enclosures as required because of location. All enclosures exposed to the weather or in exterior locations shall be weatherproof NEMA (3) (3R)(4). Enclosures in corrosive environments shall be corrosion-resistant NEMA 4X.

I. Manual starters shall be of the toggle mechanism type for full voltage starting and shall have overcurrent relays in each phase providing running overload protection.

J. Magnetic starters shall be across the line type minimum size No. 1, they shall provide running overcurrent protection in each phase and means for remote control.

K. The Contractor shall provide reduced voltage starters for 200V motors 30 HP and larger and 460V motors 50 HP and larger.

L. Reduced voltage starters shall be auto-transformer, automatic closed transition type. They shall provide running overcurrent protection in each phase and means for remote control.

M. Starters shall have individual running overcurrent protection in each phase, overload type relays, trip free with adjustable trip setting plus or minus ten percent and with manual and automatic trip reset. When starters are not adjacent to motor and not in the same ambient temperature as motors, the overload relays shall be as specified above except they shall be ambient compensated type; minus 20^{o}F to 170^{o}F. Overloads for hermetically sealed motors shall be quick-trip overloads. Starters shall have a test button for welded contacts. Each starter shall be provided with a control

transformer with 120V secondary of sufficient capacity to power the starter coil and all controls except that transformers are not required in 120V starters.

N. All starters supplied by panelboards with an IC of 20,000 amps or more and starters adjacent to motors shall be the combination disconnect type with coordinated motor short circuit protection to the interrupting capacity required. Protection shall be anti-single phasing. Protection shall be by means of combination magnetic trip only circuit breaker and integral current limiting fuses, or disconnect switch and motor circuit protectors. Disconnect switch shall have double break contact action, dead front, silver plated contacts. All poles of circuit breaker shall open when any one of the associated integral fuses blows.

O. Starters shall be provided with two pilot lights and auxiliary contacts, minimum two NO and two NC. Magnetic starters shall be a minimum of Size 1. Pilot lights shall be LED, and shall red for RUNNING and green for OFF, pilot lights for two speed starters shall be amber for low speed. Two speed starters shall be for single or two winding motors, consult appropriate sections of the specification prior to purchase of the starter to determine winding type. Remote pilot lights, pushbuttons and control switches shall be the oil-tight type. Pilot lights shall be push to test. Test switches shall be hold to test. All starters shall have hand-off-automatic switches as a minimum, and other devices as shown or as required by the control scheme.

P. The starter shall include a three position selector switch marked Hand-Off-Automatic, and the automatic-control device shall actuate the pilot control circuit of a magnetic starter when the switch is in the automatic position. Connections to the selector switch shall be such that only the normal automatic regulatory control devices will be by-passed when the switch is in the Hand position; all safety control devices, such as low- or high-pressure cutouts, high-temperature cutouts, fire alarm cutouts, freeze protection and motor overload protective devices, shall be connected in the motor control circuit in both the Hand and the Automatic positions of the selector switch.

Q. Starters for motors 25HP and larger shall have reverse phase relay, time delay relay and phase-failure relay. Time delay relay shall be Agastat pneumatic series 7000, time delay starts when coil is energized to delay motor starting, 0 to 50 seconds adjustable. Vary settings on timers in 5 second steps starting with largest motor, set at zero seconds if delay is safety hazard.

R. When combination manual-and-automatic control is specified and the automatic-control device operates the motor directly, a double-throw, three-position tumbler or rotary switch shall be provided for the manual control; when the automatic-control device actuates the pilot control circuit of a magnetic starter, the latter shall be provided with a three position selector switch marked Hand-Off-Automatic. Connections to the selector switch shall be such that only the normal automatic regulatory control devices will be by-passed when the switch is in the Hand position; all safety control devices, such as low- or high-pressure cutouts, high-temperature cutouts, fire alarm cutouts, freeze protection and motor overload protective devices, shall be connected in the motor control circuit in both the Hand and the Automatic positions of the selector switch.

2.12 CONTACTORS, RELAYS, TIMERS, TIME SWITCHES AND PHOTOCONTROLS

A. Contactors and Remote Control Switches

1. Contactors and remote control switches {RCS) shall be 1, 2, or 3 pole, rated for all classes of load, continuous duty, pole faces machine ground with shading pole, self-cleaning and self-aligning contacts, adjustable contact action and pressure, current coil magnetic blowouts on all poles and inductive load type. Provide silent mercury contacts as noted.

2. The contactors and RCS shall be electrically operated mechanically held or electrically operated magnetically held as required by load and control circuit. Where normally open {NO) or normally closed {NC) contacts are indicated for magnetically held contactors, the coil is de-energize. As the coil is energized NC contact shall open before NO contacts close.

3. Contactors and RCS shall be mounted in NEMA-l enclosure, except when mounted as an integral part of a panelboard. Provide other type enclosures as required because of location.

4. Refer to the drawings for size, type of load, and voltage.

5. Where control device may cause chattering an intermediate, time delay on drop-out, control relay shall be included.

6. Contactors and RCS shall be by Asco, Allen Bradley, General Electric, Eaton/Cutler Hammer.

B. Control Relays

1. Control relays shall have number of poles indicated and required, 25 amps minimum continuous duty, electrically operated magnetically or mechanically held according to purpose required, accurately finished, antihum ring imbedded in pole face, ferrous parts cadmium plated, insulated panel flush dead back, front connected, and silver contacts with magnetic blow-out on each pole.

2. Where normally open NO or normally closed NC contacts are indicated for magnetically held relays the coil is de-energize. As coil is energized NC contacts shall open before No contacts close.

3. Relays shall be mounted in NEMA-l enclosure, except provide other types as required because of location.

4. Enclosures exposed to the weather shall be NEMA {3R) {4) {4X) {12). Enclosures shall be surface mounted, except in finished areas where enclosures shall be flush.

5. Refer to drawings for number of poles, size, type of load, and voltage. Where control device may cause chattering a time delay on dropout relay shall be provided.

6. Time delay relays shall be electropneumatic off-delay or on-delay as required, minimum two NO and two NC contacts, Agastat, or equal.

7. Control relays shall be by Asco, Agastat, Allen Bradley, General Electric, or Eaton/Cutler Hammer.

C. Time Switches (Automatic) and Photocontrols

1. Time switches shall be photo/time control, 7 day calendar dial type, suitable for operation of mechanically held contactors, prewired to terminal block with connecting terminals for independent contactor control and photocontrol with switch for manual override.

2. Time switch dial shall permit different on-off settings for each day.

3. Photocontrol shall energize below 25 footcandles, shall have cadmium sulphide hermetically sealed cell, fully temperature compensated and 15 second time delay.

4. Spring driven reserve for mechanical timers shall be provided for 15 hours operation of time switch control in event of power failure. Restoration of power shall automatically rewind reserve.

5. Time switches shall have 3 circuit control available dusk on-preset off; dusk on-dawn off; and preset on-preset off. Time switches for lighting shall have astronomic dial.

6. Enclosure shall be NEMA-1 surface mounted, except flush mounted in finished areas. Time switches shall be by Tork, Paragon, or Intermatic.

D. Timers (Manual)

1. Timers shall be the manually preset interval type to open or close a load circuit after a preset interval.

2. The timer shall have a time indicating dial with dial knob which position indicates time left before the end of the operation. Turning the knob to the length of time the circuit should be closed or open starts the timer operating, and the knob turns slowly back to zero. It shall always be possible to manually shorten or lengthen the operation. Timer shall have a time start switch.

3. Accuracy shall be within one percent of the total dial range. The time shall be powered by an industrial type motor. If necessary a control transformer shall be provided to provide the required control voltage. Timers shall be rated 120 V, 1000 watts, 60 Hz, single pole double throw, one contact closed at zero position, one contact closed during operation.

4. Unless otherwise shown the dial range shall be 0 to 20 hrs with 30 min dial graduations.

5. Timers shall be mounted in a NEMA_1 enclosure, except when mounted as an integral part of a panelboard or switchboard, or the installation requires other type because 'of location. Enclosures shall be surface or flush mounted as required.

6. Where a single pole single throw switch only is required, timer shall be rated 20 amps, 125 V, 10 amps, 277 V, 0 to 12-hours time cycle spring operated, "off" at zero "on" during operation, flush switch box mounted. Timers shall be by Tork, Zenith, Intermatic, Paragon, or Mark-Time.

2.13 FIRE SEALS

A. Openings through fire rated floors and walls shall be sealed with U.L. listed fire seals in accordance with the NEC. The fire seals shall be U.L. Listed for the specific application.

B. Foam, if used, shall be Dow Corning Fire Retardant Silicone RTV foam or Chase foam.

C. Devices, if used, shall be by O-Z/Gedney, Crouse Hinds, Nelson, or equal.

D. Smoke and fire stop poke-through fittings shall be by O-Z/Gedney, Nelson, Raceway Components, Inc., or equal.

2.14 FIRE ALARM AND EMERGENCY COMMUNICATION SYSTEM

A. General

1. Provide fire alarm devices as shown on the drawings and ancillary devices to provide a complete system.

2. The fire alarm system shall be provided and zoned as shown on the drawings.

3. The fire alarm devices shall be UL listed, shall be in accordance with all Applicable Documents, and shall also be acceptable to and meet all requirements of the Waltham Fire Department and other Authorities Having Jurisdiction.

4. The fire alarm device shall be manufactured by the same as, and be compatible with, the existing fire alarm system

5. The installation shall be supervised, checked, and guaranteed as to performance by the manufacturer. The manufacturer or authorized representative shall provide engineering supervision without claim for extra compensation.

6. Initial tests and adjustments shall be performed under this Section. Furnish all equipment necessary and perform all work required to determine the operation of the complete system and modify the system to meet the requirements of the Contract Documents.

B. Shop Drawings

1. Shop drawings submitted for review shall be in accordance with Part One and shall also include an itemized list of equipment, quantities, dimension drawings of all equipment, mechanical characteristics of all equipment, electrical characteristics of all equipment, sequence of operation of each item and complete system, riser diagram, and complete color coded point-to-point wiring diagram as required by Part One.

2. The riser diagram shall follow the conduit arrangement shown on the contract drawings and shall include conduit sizes, conductor sizes, and number of conductors in each conduit.

3. Failure to meet the above requirements shall be cause for rejecting the system, when submitted.

4. The fire alarm work must consider all other Sections of this specification.

C. Additional Applicable Documents

1. If there is, or seems to be, a conflict between this specification and a reference document, the matter shall be referred to the Engineers. In the event of a conflict between Applicable Documents, the more stringent shall apply.

2. The current issue of the following documents shall be used:

National Fire Protection Association

NFPA 72A	Local Protective Signaling Systems
NFPA 72B	Auxiliary Protective
NFPA 72E	Automatic Fire Detectors
NFPA 90A	Air Conditioning Ventilating Systems
NFPA 101	Life Safety Code

Underwriters' Laboratories

UL-268	Smoke detectors for Fire Protective Signaling Systems
UL-521	Heat Detectors for Fire Protective Signaling Systems
UL-217	Single and Multiple Station Smoke Detectors

Massachusetts State Building Code - 780 CMR

Massachusetts Electrical Code - 527 CMR 12.00

Massachusetts Fire Prevention Regulations - 527 CMR

D. Performance

1. Alarm Condition

a. The operation of alarm initiating device shall be as follows:

(1) Fire drills shall be conducted by means of a drill switch which shall sound all signals but shall not trip the master box, and shall not prevent a true alarm from activating the system. Any manual or automatic station may also be used to conduct a drill as required by NFPA for system test.

2. Initiating and Signal Circuit Operation

a. Alarm initiating circuits shall be Class "A", which shall be wired such that a single break or single ground fault of the initiating circuit shall not prevent an alarm from being initiated.

b. Signal circuits shall be Class "A" which shall be wired such that a single break or single ground fault of the signal circuit shall not prevent an alarm signal from being sounded.

c. Supervision shall be as required by applicable codes and standards and shall include but shall not be limited to: ac power supply all wiring alarm-initiating devices, annunciator, master box system wiring, alarm relays, signal relays, lamps, OS&Y valve tamper switch wiring, fuses, supervisory devices, voltage of dc battery, and signals.

d. Separate trouble signal silencing switches shall be furnished, each with its associates pilot lamp, so that faults on the alarm initiating circuits and the alarm signal circuits can initiate trouble signals and be silences independently of each other. When trouble signals are silenced after being sounded by faults on either initiating circuit or the alarm circuit, the trouble signal shall resound when the trouble is corrected and the switch must be returned to normal. A separate pilot lamp shall be furnished that shall light in the event a trouble signal is caused by a fault on the alarm signal circuits. Any relays used for sounding alarm bells or trouble signals shall have their coils electrically supervised and sounds trouble signal in the event of an open coil.

e. Means shall be provided to sound a trouble signal upon a ground fault of less than 20,000 ohms between any supervised circuit and ground. This ground fault shall also light a trouble pilot lamp.

3. Equipment

a. Photoelectric Smoke Detectors

(1) Photoelectric smoke detectors shall be provided as shown on the drawings. The detector shall be UL 268 listed. Detectors shall be factory set to detect smoke at no greater than 1.5 percent light obscuration per foot. Detectors shall include self-compensating circuitry to provide maximum stability against effects of aging, dust and film accumulation. Detectors shall be designed for twist-lock mounting on the separate base assembly. The detector shall lock into alarm. The detector light source shall be a light emitting diode. The detector shall contain a test feature which simulates smoke. The detector base shall be of the "two-wire" type and shall utilize the same two wires for both detector power and alarm. The entire "Class A" detector circuit shall require only 4 wires for detector power and alarm functions. Smoke detectors shall be manufactured by Simplex, Honeywell, Grinnell or approved equal.

b. Low Profile Heat Detectors

(1) Low Profile Heat Detectors shall be provided as shown on the drawings. Detectors shall be UL listed 135 Degree Fixed Temperature and Rate of Rise Detector or 200 Degree Fixed Temperature Only. Heat detectors in areas subject to wide temperature swings, such as mechanical rooms shall be fixed temperature type.

2.15 SEISMIC RESTRAINTS AND VIBRATION ISOLATION

A. General

1. All isolation and seismic restraint devices shall be capable of accepting, without failure, the "G" forces as determined by the seismic certification and calculations.

2.16 NURSE CALL SYSTEM

A. Description

1. General

a. Furnish all labor, materials, tools, equipment and services for audio-visual nurse call systems/code blue system as indicated on the drawings or required.

b. Although such work is not specifically indicated, the Electrical Contractor/Nurse Call manufacturer shall furnish and install all

supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

2. Submittals

   a. Product data

      (1) Technical data on each product, including finishes.

      (2) Detailed description of system operation.

      (3) Detailed, room by room diagrams/system data/riser diagrams.

      (4) Equipment design considerations for future expansions**.**

      (5) Materials list and backbox schedule. (Including unique backboxes.)

   b. Project Data

      (1) Operating and Maintenance Data

         (a) Factory prepared operation and service manual

         (b) Include operation details, schematics, wiring diagrams, color coding, terminal numbers.

      (2) Owner Instruction reports.

3. Outline of responsibilities

   a. Nurse Call manufacturer/Owner will supply the following:

      (1) Equipment

      (2) Devices

      (3) Testing

      (4) Warranty service staff training (approved by Owner)

      (5) Shop drawing, wiring diagrams.

   b. The Electrical Contractor will provide the following:

      (1) Backboxes

      (2) Conduit system with pull strings.

      (3) 120V - single phase equipment connections.

(4) Mounting of all Nurse Call control cabinets.

(5) Final connections/splicing and installation of Nurse Call devices.

(6) Cabling for the Nurse Call System shall be provided by the Electrical Contractor based on Nurse Call manufacturer's recommendations.

4. The equipment furnished under this Specification shall be the standard product of one manufacturer.

5. All components and the system as a whole shall meet or exceed the minimum standards issued by the Electronics Institute of America (EIA). All work in conjunction with this installation shall meet the provisions of the latest National Electric code and other applicable codes.

B. Conduit

1. The Nurse Call System shall utilize conduit from device to above ceiling cavities. Minimum size 3/4 inch conduit.

C. Training of Personnel

1. Nursing staff and maintenance staff shall be thoroughly instructed in the use of the Nurse Call System by authorized distributor personnel. The service shall be provided in conjunction with the Nurse Call equipment.

a. The Nurse Call supplier shall provide instructions to the staff by means of an actual instructional system. The instructional system shall consist of a floor control station, single patient stations, staff, duty and emergency stations and assorted call-in cord sets. The instructor shall demonstrate each function of the system with all lamps, screens and tones in operation. Maintenance instruction shall be performed in the same manner as described above.

b. Training shall include a minimum of three (3) hours per shift.

END OF SECTION

PART 3 - INSTALLATION

3.01 GENERAL

A. Make all penetrations smoke-proof every night during construction.

B. Openings through fire rated floors and walls shall be sealed with UL listed fire seals for the specific application. The fire seals shall be installed in accordance with the manufacturer's instructions, its UL listing and the MEC while maintaining the full fire rating of the barrier in which it is installed.

C. Before any work is done on electrical equipment. The contractor shall establish phases and document A, B, and C, rotation. This arrangement shall then be maintained during installation and verified at the completion of project.

D. Disconnect existing electrical equipment scheduled for demolition and make safe for demolition.

E. Where new wiring devices, wiring, or fixture locations are shown on the drawings but building construction makes it advisable or necessary to change such locations to new locations within 10 ft. Such changes shall be made by the contractor with the consent of the engineer and architect at no additional cost to the owner.

F. Terminals shall be arranged phase A-B-C or 1-2-3 from left to right, top to bottom, and front to back.

G. Branch circuit phase wires shall be connected to separate phases of the supply source to assure a balanced condition in that circuit and proper load balance on the panel.

H. Interruption of Service

1. All electrical work, installation of equipment, and other work, shall be carried out so as to prevent interference with normal building operations. Where electrical connections necessitate an interruption of any circuit or feeder, first make the necessary arrangements with project manager.

2. All work shall be sequenced to provide minimum outage time.

3. Coordinate interruption of services (e.g. electrical, telephone) with Terminals shall be arranged phase A-B-C or 1-2-3 from left to right, top to bottom, and front to back.

I. Panels

1. Complete panel circuit directory card indicating loads controlled by each circuit and panel name.

2. Verify circuit and panel designations. Circuit numbers are used as a guideline. Electrical contractor shall balance panel loads and designate circuits accordingly. Receptacle circuiting not shown shall be determined in the field.

J. Provide laminated plastic engraved nameplates with 1/4 in. high white letters and black background for panelboards, switches, pull boxes, junction boxes, and motor disconnect switches, designating name, equipment controlled or function.

K. Nameplate Color Coding Shall Be:

Normal Power: Black with White Lettering.

L. The Contractor shall install all equipment or material purchased by or furnished to him as stated in PART ONE.

M. The Contractor shall install equipment so as to avoid interference with the structure and with the work of others preserving adequate headroom and clearing doors and passageways, to the satisfaction of Engineers and in accordance with this specification and the requirements of applicable codes and authorities. Installation shall permit clearance for access to equipment for repair, servicing, and replacement.

N. The Contractor shall install equipment so as to properly distribute equipment loads on building structural members provided for equipment support under other Sections. Roof-mounted equipment shall be installed and supported on structural steel provided under other Sections.

O. The Contractor shall install all equipment and systems in accordance with their UL listing. The Contractor shall be cognizant of all such UL listing installation requirements.

P. The Contractor shall provide suspended platforms, threaded rods, strap hangers, brackets, shelves, strands, or legs as necessary for floor, wall, or ceiling mounting of equipment provided under this Section as indicated on the Drawings and in Specifications. The Contractor shall provide steel supports and hardware for proper installation of hangers, anchors, guides, etc, and shall provide cuts, weights, and other pertinent data required for proper coordination of equipment support provisions and installation. Structural steel and hardware shall conform to Standard Specifications of ASTM; the use of steel and hardware shall conform to requirements of Section Five of Code of Practice of American Institute of Steel Construction.

Q. The Contractor shall verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly which will void warranty, and shall report in writing to the Engineers, prior to purchase or shipment of equipment involved, on conditions which may prevent proper installation.

R. The Contractor shall cooperate and coordinate with the Purchaser, Engineers, and the work of other Divisions and Section in executing work of this Section as described

hereunder and as described in Part 1. Work shall be performed so that the prioress of the entire project shall not be interfered with or delayed. The Contractor shall arrange to de-energize and/or energize equipment as necessary to accommodate the work of others, and shall delegate an electrician to advise others as necessary in regard to electrical hazards.

S. The Contractor shall obtain detailed information from manufacturers of equipment provided under this Section as to proper methods of installation, and shall also obtain final roughing dimensions or other information as needed for the complete installation of items furnished under other Section or by the Purchaser.

T. The Contractor shall keep fully informed of shape, size, and position of openings required for material or equipment to be provided under his and other Sections, and shall give full information so that openings required by electrical work may be coordinated with other work and other openings and may be provided for in advance. In case of failure to provided necessity and sufficient information in proper time, the Contractor shall do his own cutting and patching under his Section at no additional cost to the Purchaser and to full satisfaction of the Engineers.

U. The Contractor shall provide all information as requested as to sizes, number, and locations or concrete housekeeping pads necessary for floor-mounted equipment provided under this Section. The Contractor shall ensure that such pads are in place before installation the equipment.

V. The Contracts shall notify Engineers of location and extent of existing wiring, conduit, fixtures, and equipment which interferes with new construction. IN coordination with and with approval of the Engineers, the Contractor shall relocate such wiring, conduit, fixtures, and equipment to permit new work to be provided as required by the Contract Documents. With approval of the Engineers, the Contractor shall remove non-functioning or abandoned wiring, conduit, fixtures, and equipment. If requested by the Engineers, the Contractor shall remove nonfunctioning wiring, conduit, fixtures, and equipment which does not interfere with new work and shall dispose of store items as requested by engineers.

W. The Contractor shall provide maintenance for Electrical equipment and systems until final acceptance by the Engineers and the Purchaser and take measures necessary to ensure adequate protection of equipment and material during delivery, storage, installation and shutdown conditions. The Contractors responsibility shall include provisions required to meet conditions incidental to delays pending final test of systems and equipment under seasonal conditions.

X. The Contractor's use of premises shall be restricted as directed by the engineers and as required below. Abandoned exposed equipment, outlets, conduit and wire shall be removed; abandoned concealed equipment, and wiring interfering with new work shall also be removed. Unless specified for reuse, abandoned material shall be removed from premises.

Y. The Contractors shall, as required, during the progress of work, remove and properly dispose of resultant dirt and debris, and keep premises reasonably clean. Upon

completion of work, the Contractor shall remove equipment and unused material provided for the work and put the building and premises in neat and clean condition, and do cleaning and washing required to provide acceptable appearance and operation of equipment, to the satisfaction of the Engineers.

Z. The Contractor shall conduct work so as not to interfere with functioning of existing sewers and water and as mains and shall confer with the Engineers and Utility as to disruption of electric services or other utilities due to testing or connection of new work to existing work. Prior to interruption of services, the Contractor shall obtain the approval of the Engineers and the Utility as to the method proposed to minimize services interruption.

AA. The Contractor shall base measurements, both horizontal and vertical, on reference points established by the Contractor and be responsible for correctly laying out the work. In the event of a discrepancy between actual measurements and those indicated, the Contractor shall notify the Engineers in writing and shall not proceed with work until written instructions have been issued by the Engineers.

3.02 RACEWAYS AND FITTINGS

A. All abandoned and empty raceways shall be removed unless used for work pertaining to this project. Electrical equipment taken out of service shall be disconnected and removed.

B. Raceways shall be sized per MEC unless larger sizes are shown on the drawings. Branch circuits, feeders, and special systems shall be in EMT, except: (1) for normal power branch circuits and lighting circuits where type mc cable or hospital grade type AC is permitted by the MEC; (2) where the MEC requires IMC, RSC, or wireways, etc; (3) where the type is noted on the drawings.

C. Raceways shall be as close as possible to slab above and shall run at right angles to the walls. Conduit fill shall not exceed 40 percent.

D. All wiring and raceways shall be concealed unless specifically noted in the drawings as exposed.

E. Measuring tape (e.g. Greenlee number 435) shall be installed in spare conduit runs.

F. The raceway shall be installed to provide a complete system as required by the project scope of work.

G. Raceways shall be free from Burrs and sharp edges over the entire length.

H. All conduits that enter ducts prior to their termination point must maintain separation from other cables via use of dividers, cross-over tunnels, or flexible conduit provided from entrance into duct to exit from duct.

I. Electrical raceways with removable covers shall be accessible for the entire length. Floor ducts and boxes shall have watertight covers. In any case of non-accessible

floors, walls and ceilings, provide an adequate number of access hatches. Access should be provided to enable installation of cabling. Approved conduits may be substituted. All raceways shall be designed to contain cables when covers are removed, for example, wireways above the ceiling may need to be mounted with covers up. Raceways illustrated on the drawings are based on the length of furnished cables. Verify length of raceways do not exceed length as shown in the "CONDUITS REQUIRED" schedule. Raceways above the ceiling shall be kept as near to finished ceiling as possible.

J. Ducts shall be divided into separate channels by metal dividers as required.

K. All wireways and raceways shall be grounded using an insulated 36 AWG green conductor terminated using solderless lugs. All ceiling mounted structural support members and ceiling plated shall also be grounded. All grounding connections, terminals, etc. shall be installed to allow accessibility for inspection, maintenance, repair, etc.

3.03 CONDUCTORS

A. Cable pull-bys shall not be performed where new conductors are to be added to a raceway in use, installed conductors shall be removed, inspected for damage, and pulled in with new conductors. Existing cable damaged shall be replaced.

B. Cable damaged during handling or pulling operations shall be replaced by the contractor, without any cost to the owner for material or labor.

C. Feeders, subfeeders, and branch circuits 20 A or larger, and all receptacle circuits shall contain a grounding conductor sized per the MEC, minimum No. 12 copper with green insulation.

D. Branch Circuits And Feeders Shall Be Color Coded As Follows:

	208/120V
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Grounding	Green

3.04 BOXES AND COVERS

A. Outlets shall be centered in the panels and spaces provided for them. If any discrepancy is found to exist between outlets as shown on the Electrical Drawings and

Architectural Drawings, the Contractor shall notify the Engineers to have locations verified prior to installation. The Contractor shall verify, before roughing, the exact location of all outlets for equipment requiring electric service. Reasonable changes in the location of outlets and equipment (within ten feet) shall not involve additional charges. The Contractor shall determine door swings from the Architectural drawings before roughing switch outlets.

B. Where outlets of any system occur, the Contractor shall provide suitable boxes and conduit so that they may be built in as the work progresses. Box offsets shall be made at all outlets to provide proper adjustment to structural and architectural finish. Outlet boxes shall be concealed unless otherwise noted.

C. Where outlets of any systems occur, the Contractor shall provide suitable boxes and conduit so that they may be built in as the work progresses. Box offsets shall be made at all outlets to provided proper adjustment to structural and architectural finish. Outlet boxes shall be concealed unless otherwise noted.

D. Consult with the engineers and those performing the work of Division 9 regarding centering of outlets in ceiling tiles.

E. Do not install boxes back-to-back in the same wall. Coordinate putting of masonry walls to achieve neat openings for boxes. Use rotary cutting equipment to cut masonry work for installation of electrical fittings.

F. All outlet boxes and plaster rings recessed in wall and ceilings shall be positioned such that the material to be mounted therein shall set even all around the contact edges with no visible cracks or indications of misalignment. Any such defective installation and workmanship shall be repaired at the Contractor's expense under his Section at no expense to the Purchaser. Outlets in walls for devices, fixtures, and various systems shall be installed at the following heights unless otherwise indicated on the drawings.

Switches	4ft – 0 in.
Receptacles (general)	1ft – 6in.
Telephones (general)	1ft – 6in
Telephones (wall mounted)	4ft – 6in.
Pushbutton Stations	4ft – 0in.
Fire Alarm Stations	4ft – 0in.
Fire Alarm Signals	7ft – 0 in.

G. The Contractor shall advise the Engineers prior to roughing in if any of the above heights differ from local codes. For outlets mounted above counters, benches, splashbacks, the Contractor shall coordinate location and mounting heights with built-in units, and shall adjust outlet mounting heights to agree with required locations for equipment serves.

H. Pullboxes and junction boxes shall be located above removable ceilings or in electrical rooms, utility rooms or storage areas.

I. Outlet boxes mounted in exterior walls shall be provided with insulation behind the box to prevent condensation.

J. All boxes shall have cover plates installed thereon. The Contractor shall arrange for electrical inspection in required by local authority before covers are installed and arrange for final inspection by local authority after covers are installed.

3.05 WIRING DEVICES

A. Unless otherwise shown or stated, receptacles shall be installed vertically, with grounding pole at top. If receptacle is mounted vertically the grounded pole shall be on top.

B. The screw-type back or side wiring clamps shall be securely tightened whether or not the clamps are spring loaded.

3.06 PANELBOARDS

A. Provide mounting brackets, bus-bar drillings, and filler pieces for unused spaces.

B. Prepare and affix typewritten directory to inside of panelboards indicating loads controlled by each circuit, panel name, and source.

C. Single or gang panelboards assemblies shall be installed with the tops of panelboards 6 ft. above the floor. Those in finished spaces shall be set flush in walls, and those on unfinished walls or where shown exposed on the drawings shall be set exposed.

D. Cabinets shall have fronts straight and plumb and arranged so that panelboards will be centered vertically in opening.

E. Emergency lighting, fire alarm, exit sign and other life safety circuits shall have their circuit breakers "locked-on" to prevent inadvertent manual tripping of those circuits. The manufacturer's standard handle locking devices shall be used for this purpose.

F. Verify circuit and panel designations. Circuit numbers are used as a guideline. Electrical contractor shall balance panel loads and designate circuits accordingly. Receptacle circuiting not shown shall be determined in the field.

G. Panels and cabinets shall be supported on galvanized steel channels independent of partitions. Channels shall be secured to floor, structure above, and partition. Cabinets and assemblies shall be rigidly secured in place in a manner satisfactory to the Engineers.

3.07 LIGHTING

A. Lighting fixtures shall be installed as shown and detailed on the drawings.

B. Rows of fixtures shall be installed accurately as to line and level. Fastenings and supports shall be firmly set so that the fixtures will not be distorted by handling incident to normal maintenance. All parts including lamps shall be secured to prevent falling or dislocation. The use of tong type hangers for suspending fluorescent fixtures is prohibited.

C. The Contractor shall clean all lamps and lighting fixtures before final inspection.

D. At the time of final inspection, all fixtures and equipment shall be complete with the required louvers, glassware, and/or reflectors, which shall be clean and free of defects. Any glassware or reflectors damaged prior to the time of final acceptance shall be replaced.

E. Outlet and utility boxes concealed in the construction shall be firmly secured in place, set true, square, and flush with the finished surfaces for the application of the appropriate cover plate. Boxes shall be rated for application. Where required, boxes shall be provided with plaster rings.

F. Recessed fixtures shall fit without distorting fixtures, frame or ceiling.

G. Lighting fixtures shall be supported from building structural elements independent of furred or suspended ceilings. Supports for fluorescent fixtures shall be jack chain or rod. Minimum of 2 supports per 4 ft of fixture. Recessed fixtures shall be connected by flexible metallic conduit to junction box.

H. Mounting Provisions

1. Surface mounted fixtures longer than 2 ft shall be supported at an additional point besides the outlet box fixture stud.

2. Individually mounted pendant fixtures longer than 2 ft shall be provided with, twin stem hangers. Stems shall have ball aligners and provisions for 1 in. minimum vertical adjustment. Rows of continuous fixtures shall be mounted with one more stem hanger than the number of fixtures in the row.

3. Pendant fixtures within the same area shall be installed plumb and at a uniform height.

I. Installation of Lighting

1. The Contractor shall furnish and install all equipment and material required for the lighting systems in accordance with the drawings and fixture schedules and as specified herein. Systems include fixtures, lamps, distribution panelboards, switches, controls, wire, raceways, supports, transformers, fittings, material, and accessory equipment.

2. Lighting drawings are diagrammatic, with fixture outlets located approximately to scale but not dimensioned. Raceways are not generally shown. The Contractor

shall check lighting drawings against field conditions and the drawings of other disciplines for interferences and shall select and layout locations for outlets.

3. The Contractor shall provide a completed installation which is of good appearance, with rows of fixtures properly aligned and leveled and raceways run neatly and inconspicuously.

4. The Contractor is not responsible for the footcandles of illumination provided by the completed systems. However, if after the lighting is installed and in operation, any areas are noted which are obviously under or overlighted, the Contractor shall promptly advise the Engineers and, if required, make changes as directed in writing by the Engineers. Costs are to be in accordance with unit prices submitted at the time of bidding.

5. It is essential, in order to minimize the extent and duration of temporary lighting work, that the permanent lighting systems be installed and made operative as early as practicable. The Contractor shall install permanent lighting equipment wherever practicable. In active construction areas where permanent fixtures may be subject to abuse or damage, the fixtures may be omitted and temporary fixtures connected to pigtails in the permanent outlet boxes. Services to complete or partially complete systems may be provided from temporary power sources, as required. When a portion of a system is completed, it shall be tested as outlined in the Testing section of this specification and placed in permanent operation.

6. Lamps furnished for temporary use during the construction period shall be similar to those shown on the fixture schedule. Broken or inoperative lamps shall be replaced promptly. Fixtures shall be protected and maintained in good condition during construction. At the completion of the work, all fixtures shall be cleaned, inspected, and repaired, or replaced if damaged, and a complete set of new incandescent lamps shall be installed. Fluorescent and high intensity discharge lamps shall be "burnt in" for at least 100 hr prior to final inspection.

7. Equipment shown on lighting drawings, such as lighting controls, contactors, and photocell switches, shall be furnished and installed as shown. Lighting transfer switches and auxiliary equipment for automatic transfer of lighting circuits from normal supply to emergency supply shall be furnished and installed as shown.

8. Fixtures mounted on outlet boxes shall be secured to fixture stud in outlet box. Hickies or extension pieces shall be installed where required.

J. Exit Signs

1. Internally illuminated exit signs shall be provided at all exits. Internally illuminated directional exit signs shall be provided in corridors where direct sight of the exit is not possible, and at intersections of corridors. On long escape routes, directional exit signs shall be located no further than 100 ft apart. Each exit sign shall be oriented for maximum visibility from the egress route which progresses toward that sign, and shall be readily visible from any direction of exit access.

3.08 MISCELLANEOUS AND LOW VOLTAGE DRY TYPE TRANSFORMERS

A. Mounting

1. Low voltage transformers shall be floor or wall mounted as shown on the drawings. Wall mounted transformers less than 45 kVA shall be set on steel channels which shall be suspended from building structural elements. The bottoms of wall mounted transformers shall be a minimum of 7 feet above finished floor.

3.09 GROUNDING

A. Furnish and install a complete grounding system conforming to the NEC, IEEE Std 142, and as required by the (Name of Municipality) Electrical Wiring Inspector. Where specific grounding requirements are omitted from the drawings, the minimum requirements of the NEC shall apply. All feeders, subfeeders, and branch circuits larger than 20 amp, and all receptacle circuits shall contain a grounding conductor minimum No.12 copper with green insulation. These conductors are not normally shown on the drawings but shall be provided.

B. The grounding terminal on receptacles shall be bonded to the grounding conductor to establish grounding continuity, and the receptacle shall be UL listed self-grounding type.

C. All feeder raceways shall include a separate grounding conductor.

D. Grounding conductors shall be match phase conductors (stranded or solid) copper wire with green color insulation matching the type of insulation of the power wiring.

E. Provide telephone equipment room and telephone service conduit grounding as required by the telephone utility and by applicable codes and tariffs. Provide telephone closet grounding to backboards as required by the telephone utility. Provide one No.8 AWG copper grounding conductor from each separate communications system to electrical room ground bus.

3.10 DISCONNECT SWITCHES AND FUSES

A. The Contractor shall review every motor in this project. If a disconnect switch is not specified with that motor under the Section where the motor is specified, a disconnect switch shall be provided under this Section whether or not the switch is shown on the drawings.

B. The Contractor shall install all disconnect switches as recommended by the manufacturer and as required by the applicable code and shall secure the switch to the building construction or to a plywood panel behind the ~witch with wood screws, anchor bolts, or other approved fasteners.

3.11 MOTOR CONNECTIONS AND CONTROLS

A. The Contractor, under this Section, shall wire to and connect all motors and provide all motor disconnect switches and starters unless otherwise noted on the electrical drawings. Connection to motors shall be made with liquid-tight flexible metal conduit with an equipment approved grounding conductor.

B. Motor starters shall be mounted on a 1 in. thick select exterior grade plywood mounting board finished with fire resistant paint to match starter enclosures.

C. The Contractor shall submit for review and record a complete list or schedule of all motors 1/6 hp and larger indicating motor number, purpose or function, manufacturer, horsepower, phase, code letter, nameplate requirements for type of protective device, service 'factor, nameplate voltage, nameplate running amperes, actual measured running amperes with specified load, and actual measured running voltage at motor with load. The schedule shall also indicate starter manufacturer, catalog number, size, type, heater number, and heater ampere range. The actual measured running amperes of motors shall be taken after the systems have been balanced. The Contractor shall submit a copy of the heater table with the schedule. A sample schedule will be furnished if requested.

D. The Contractor shall select the overload heater size for each motor based on the motor nameplate current and starter manufacturer's recommendations. Where motors are supplied with running capacitors for improved power factor, reduce overload heater size to size recommended by motor manufacturer for that situation.

E. When motors are supplied with built-in thermal sensors in the motor windings, connect the thermal contacts in series with the overload control circuit of the starter.

3.12 CONTACTORS, RELAYS, TIMERS, TIME SWITCHES AND PHOTOCONTROLS

A. Provide engraved nameplates for all contactors and time switches showing equipment number (if assigned) and function.

3.13 FIRE SEALS

A. Fire seals shall be installed in accordance with the manufacturer's instructions, and in accordance with the conditions of their U.L. listing, to maintain the full fire rating of the barrier in which they are installed.

B. Poke-through fittings shall be provided for floor mounted outlets as shown on the drawings. The fittings shall be installed in holes which shall be core-drilled through the slab. Core drilling locations shall be approved by the Engineers prior to drilling.

3.14 FIRE ALARM AND EMERGENCY COMMUNICATION SYSTEM

A. Acceptance Tests

1. All portions, functions, operations, and equipment of this system; including but not limited to all manual stations, automatic smoke and fire detectors, signals, lights, controls, batteries, connections to other systems/equipment, city connection, and annunciation shall be thoroughly tested after installation. Notify the Engineers and Authorities having Jurisdiction in writing two weeks prior to date set for test.

2. The system shall be considered ready for initial acceptance testing only after all necessary preliminary tests have been performed and any deficiencies have been corrected to the Manufacturer's and Engineers' satisfaction.

3. The Manufacturer's Representative shall be present during such initial acceptance testing and shall provide all necessary assistance to the Contractor and Engineers in the conduct of such testing.

4. The Manufacturer's Field Representative shall prepare and the Contractor shall submit a notarized initial acceptance test report to the Engineers for approval within five working days after the acceptance test. Submit six copies of the test report. The test report shall itemize all system functions, operations, and equipment which were tested and shall indicate the status of each such test. The test report shall include dates, names and titles of persons present during test, equipment tested, method of test, test results, instruments used, and adjustments, if any, to meet requirements of the specification. If tests indicate that there is a noncompliance of any item, the report shall make special note of the item or items and the reason for noncompliance.

5. The final acceptance test shall begin when the system passes the initial acceptance test. The final system acceptance test shall consist of fifteen (15) days of actual on-line system use by the Purchaser. Failure of any part(s) of the system during that period will reset the test start date for the next 15 days to the time of that component repair. The final acceptance test shall be reported, by the Engineers, on the approval copy of the Manufacturer's Acceptance Test Report.

B. Installation, Operating and Maintenance Instructions

1. Submit four complete, bound copies of the installation, operation and maintenance instructions for each item of equipment furnished. All final instructions shall be certified by the manufacturer as applicable to the equipment furnished, and shall be specifically identified, such as by serial number.

2. Instructions shall be specific regarding when lubricants are to be used.

C. Wiring

1. Wiring shall be provided in accordance with NEC Article 760, applicable articles of this specification, and wiring diagrams furnished by manufacturer. The number of wires shown are minimum. Consult with the manufacturer prior to bid and provide any and all additional wiring that may be required. Provide ten percent spare conductors in each raceway but not less than two spare conductors.

2. Conductors shall be copper type THW or THWN jacket of vulkene. Insulation shall be color coded. Conductors to detectors shall be shielded of required by detector manufacturer. Minimum size conductor shall be No. 14. Increase conductor size if required by manufacturer.

3. Conductors shall be identified as fire alarm wiring in all outlets, fittings, boxes, and terminal cabinets.

4. All wiring shall be installed in metal conduit, unless otherwise shown. Conduit fill shall not exceed 40 percent.

5. Wires for local fire alarm system shall be color coded to correspond with manufacturers wiring schematics submitted with shop drawings, sized as recommended by manufacturer of fire alarm system and installed in conduit. Combined cross sectional area of conductors or cables shall not exceed percentage of fill specified in Table 1, Chapter 9 of NEC. Conduit size shall be coordinated with fire alarm manufacturer.

6. Each junction box capacity shall be 40 percent greater than that required for associated fire alarm system wires. Each junction box shall be painted fire alarm red and identified with white markings "FIRE ALARM SYSTEM".

7. Provide, in accordance with manufacturer's instructions, wiring, conduit and outlet boxes required for erection of complete system as described herein and as shown on Drawings.

8. Final connections between equipment and wiring system shall be made under supervision of manufacturer's representative.

D. Warranty

1. The fire alarm equipment shall be warranted for one year after acceptance of the fire alarm system. The fire alarm system shall be accepted upon substantial completion of the building as defined in the Agreement, provided the fire alarm system and associated parts have nit malfunctioned in any way after passing the final acceptance test. Should the fire alarm system malfunction prior to substantial completion, the 15 day period shall start again at day one after the malfunction has been corrected and the system retested as specified above.

3.15 SEISMIC RESTRAINTS AND VIBRATION ISOLATION

A. General

1. Isolation and seismic restraint systems shall be installed per the manufacturer's submittal data.

2. Vibration isolators shall not cause any change of position of equipment resulting in stress on equipment connections.

B. Seismic Restraints

1. All floor mounted equipment whether isolated or not shall be snubbed, anchored, bolted or welded to the structure. Calculations that determine that isolated equipment movement may be less than the operating clearance of snubbers (restraints) do not preclude the need for snubbers. All equipment must be positively attached to the structure.

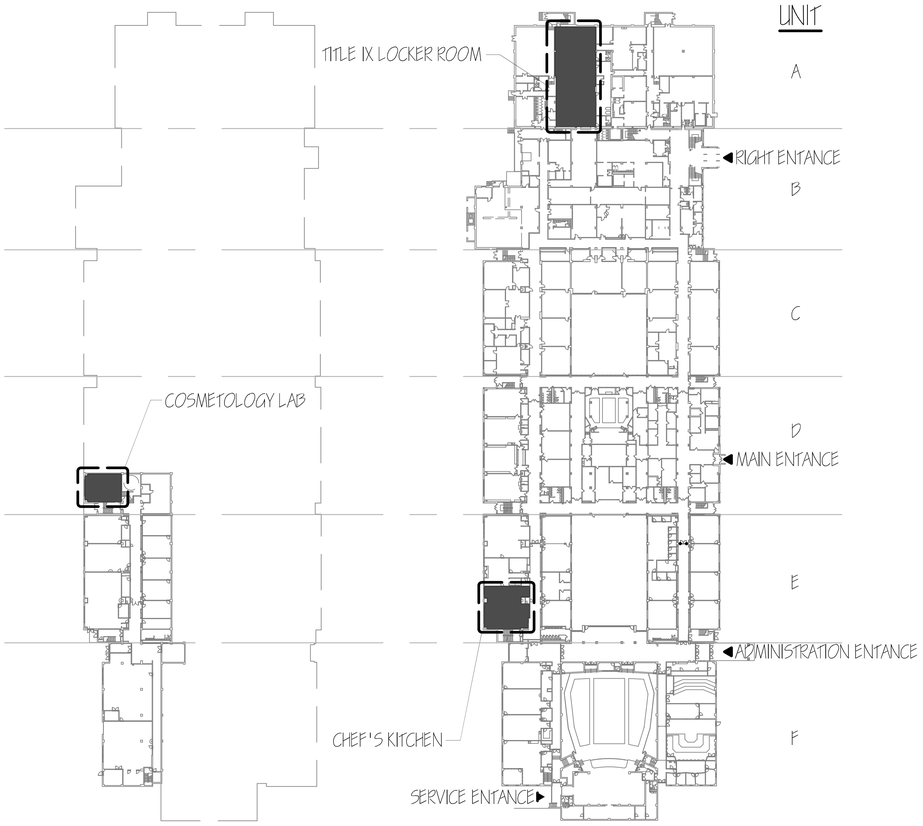
2. All suspended equipment including, but not limited to transformers, etc. shall be two or four point independently braced with TYPE III restraints. Install cable braces taught for non-isolated equipment and slack with ½" cable deflection for isolated equipment. Rod bracing shall be installed as per approved submittals and shop drawings. Equipment connected to ductwork weighing less than 75 lbs. is excluded.

END OF SECTION 16000

WALTHAM HIGH SCHOOL
617 LEXINGTON STREET
WALTHAM, MA 02452

CHEF'S KITCHEN
COSMETOLOGY LAB
TITLE IX LOCKER ROOM

MAY 30, 2012
BID SET



GROUND FLOOR

FIRST FLOOR

KEY PLAN

DRAWING INDEX

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DEVELOPMENT LENGTH AND SPLICE TABLE

BAR SIZE	f'_c=3ksi, NORMAL WEIGHT												BAR SIZE	f'_c=4ksi, NORMAL WEIGHT											
	TENSION													TENSION										
	TOP BARS						OTHER BARS							TOP BARS						OTHER BARS				
	CATEGORY						CATEGORY							CATEGORY						CATEGORY				
	1	2	3	4	5	6	1	2	3	4	5	6		1	2	3	4	5	6	1	2	3	4	5	6
#3	21	21	21	21	21	21	16	16	16	16	16	16	#3	18	18	18	18	18	18	16	16	16	16	16	16
#4	30	28	28	28	28	28	23	22	22	22	22	22	#4	26	24	24	24	24	24	20	19	19	19	19	19
#5	46	37	35	35	35	35	36	29	27	27	27	27	#5	40	32	30	30	30	30	31	25	23	23	23	23
#6	65	52	46	42	42	42	50	40	35	32	32	32	#6	57	45	40	36	36	36	44	35	31	28	28	28
#7	89	71	63	50	49	49	69	55	48	39	38	38	#7	77	62	54	43	42	42	59	48	42	33	33	33
#8	117	94	82	66	59	56	90	72	63	51	45	43	#8	102	81	71	57	51	48	78	63	55	44	39	37
#9	148	119	104	83	74	63	114	91	80	64	57	48	#9	129	103	90	72	64	55	99	79	69	56	50	42
#10	188	151	132	106	94	76	145	116	102	81	73	58	#10	163	131	114	92	82	65	126	101	88	70	63	50
#11	231	185	162	130	116	93	178	142	125	100	89	71	#11	200	160	140	112	100	80	154	123	108	86	77	62

TYPICAL ABBREVIATIONS
d_b= NOMINAL BAR DIAMETER
> = GREATER THAN
≥ = EQUAL TO OR GREATER THAN
< = LESS THAN
≤ = EQUAL TO OR LESS THAN

NOTES:

1. LENGTHS ARE BASED ON f_y= 60 KSI AND NORMAL WEIGHT CONCRETE.
2. TENSION LAP SPLICE LENGTHS ARE FOR "CLASS B" SPLICES. LESSER SPLICE LENGTHS MAY BE SUBMITTED BY THE CONTRACTOR PROVIDED FULL CALCULATIONS AND REFERENCE TO THE APPLICABLE PORTIONS OF ACI 318-95 ACCOMPANY THE SUBMITTAL.
3. TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS PLACED IN THE MEMBER BELOW THE BAR.
4. WHERE BARS OF DIFFERENT SIZES ARE SPLICED, LAP SPLICE LENGTH SHALL BE AS REQUIRED FOR THE LARGEST BAR.
5. CATEGORY 1 OR CATEGORY 2 LAP SPLICE LENGTHS MUST BE APPROVED BY THE ENGINEER.
6. #11 AND SMALLER EDGE BARS WITH CENTER-TO-CENTER SPACING NOT LESS THAN $6d_b$ ARE ASSUMED TO HAVE A SIDE COVER NOT LESS THAN $2.5d_b$, OTHERWISE CATEGORY 5 APPLIES RATHER THAN CATEGORY 6.
7. WHERE LIGHTWEIGHT AGGREGATE CONCRETE IS SPECIFIED, MULTIPLY THE ABOVE TENSION VALUES BY A FACTOR OF 1.3.
8. FOR EPOXY-COATED REINFORCING BARS, MULTIPLY THE VALUES ABOVE BY ONE OF THE FOLLOWING FACTORS:

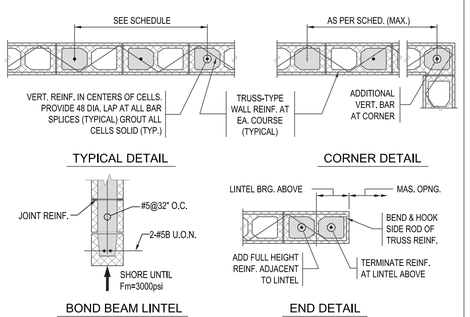
COMPRESSION (ALL CONCRETE STRENGTHS)	
DEVELOPMENT LENGTH	ALL BARS: 22 $d_b \geq$ 8"
LAP SPLICE LENGTH	#3 THROUGH #11: 30 $d_b \geq$ 12"

CATEGORIES					
STRUCTURAL ELEMENT	CONCRETE COVER	CATEGORY, ACCORDING TO CENTER-TO-CENTER BAR SPACING			
		≤ $3d_b$	> $3d_b$ < $4d_b$	≥ $4d_b$ < $6d_b$	≥ $6d_b$
BEAMS, COLUMNS & INNER LAYER OF WALLS OR SLABS	≤ d_b	1	1	1	2
	> d_b	1	3	5	6
ALL OTHERS	≤ d_b	1	1	1	2
	> d_b < $2d_b$	1	3	3	4
	≥ $2d_b$	1	3	5	6

BAR COVER AND SPACING	TOP BARS	OTHER BARS
COVER < $3d_b$ OR C.-C. SPACING < $7d_b$	1.31	1.50
COVER ≥ $3d_b$ AND C.-C. SPACING ≥ $7d_b$	1.20	1.20

MINIMUM CONCRETE MASONRY WALL REINFORCING SCHEDULE

WALL LOCATION	WALL THICKNESS (NOMINAL)	VERT. REINF.	HORIZ. TRUSS-TYPE REINFORCING
ELEVATOR SHAFTS	8"	#5 @ 32"	9 GA. TRUSS-TYPE @ 8" O.C.
NOTE: REFER TO PLANS & SECTIONS FOR ANY REINFORCING REQUIREMENTS MORE STRINGENT THAN IN THIS SCHEDULE.			



LOOSE STEEL LINTEL SCHEDULE

MASONRY OPENING	LINTEL SIZE
UP TO 3'-0"	L $3\frac{1}{2}$ x $3\frac{1}{2}$ x $\frac{5}{16}$
3'-1" TO 4'-6"	L 4 x $3\frac{1}{2}$ x $\frac{5}{16}$ (4" LEG VERT.)
4'-7" TO 6'-0"	L 5 x $3\frac{1}{2}$ x $\frac{5}{16}$ (5" LEG VERT.)
6'-1" TO 8'-0"	L 6 x $3\frac{1}{2}$ x $\frac{5}{16}$ (6" LEG VERT.)

NOTES:

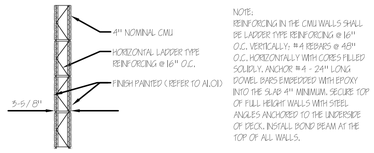
1. PROVIDE LINTELS OVER ALL OPENINGS EXCEPT WHERE LINTEL BLOCKS ARE PROVIDED.
2. PROVIDE ONE ANGLE FOR EACH 4" OF WALL THICKNESS. FOR 6" WALLS PROVIDE TEE OR BUILT-UP SECTION WITH PROPERTIES EQUAL TO OR GREATER THAN 1.5 TIMES ANGLE PROPERTIES FOR 4" WALL THICKNESS.
3. PROVIDE 8" OF BEARING EACH END OF ALL LINTELS.
4. PROVIDE GALVANIZED STEEL AT EXPOSED AREAS.
5. SEE ARCH. AND M. & P. DRAWINGS FOR OPENINGS IN NEW AND EXISTING WALLS.

REINFORCED MASONRY LINTEL SCHEDULE (U.N.O. ON PLAN)

MASONRY OPENING WIDTH (L)	LINTEL SIZE (8" NOMINAL WIDTH)

NOTES:

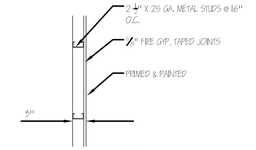
1. LINTELS ABOVE ARE FOR CONDITIONS WITHOUT CONCENTRATED LOADS WITHIN A TRIANGULAR AREA ABOVE THE LINTEL (BASE = L, HEIGHT = L/2).
2. CONTINUE BARS 2'-0" BEYOND EACH SIDE OF OPENING.
3. PROVIDE 2-#5 VERTICAL BARS IN GROUTED CELLS ON EACH SIDE OF OPENING AND CONTINUE 2'-0" ABOVE LINTEL.
4. PROVIDE SHORING UNDER LINTELS UNTIL MASONRY ASSEMBLY REACHES fm' = 1800 PSI.
5. HORIZONTAL BARS SHALL BE NO MORE THAN 3 1/2" ABOVE BOTTOM OF LINTEL.



NOTE:
REINFORCING IN THE CMU WALLS SHALL BE LADDER TYPE REINFORCING @ 16" O.C. VERTICALLY. #4 REBARS @ 48" O.C. HORIZONTALLY WITH CORES FILLED SOLIDLY. ANCHOR #4 - 24" LONG DOWEL BARS EMBEDDED WITH EPOXY INTO THE SLAB 4" MINIMUM. SECURE TOP OF FULL HEIGHT WALLS WITH STEEL ANGLES ANCHORED TO THE UNDERSIDE OF DECK. INSTALL BOND BEAM AT THE TOP OF ALL WALLS.

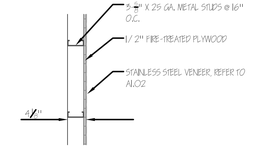
A1 CMU WALL - TO UNDERSIDE OF BEAM
3/4" = 1'-0"

A2 CMU WALL - 8'-4" A.F.F.
3/4" = 1'-0"



NOTE:
1. PROVIDE STRAPS AS REQUIRED
2. PROVIDE GYK. CAP
3. WALL TO EXTEND UP TO EXISTING WINDOW SILL HEIGHT

C METAL STUD FURRED WALL
3/4" = 1'-0"



NOTE:
1. PROVIDE STRAPS AS REQUIRED

B METAL STUD FURRED WALL
3/4" = 1'-0"

1 WALL TYPE LEGEND
3/4" = 1'-0"

PLAN NOTES:

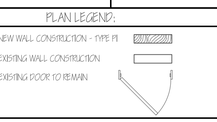
1. ALL PAINTED SURFACES SHALL HAVE HIGH GLOSS OR OTHERWISE WASHABLE FINISHES.
2. PROVIDE HOOK-UPS AS NECESSARY FOR FUTURE EQUIPMENT UNLESS OTHERWISE NOTED.
3. COORDINATE CUSTOM COUNTERTOP / SHELVING DIMENSIONS / FINISHES / REQUIREMENTS WITH ARCHITECT PRIOR TO ORDERING.
4. ALL HAND SINKS AND PREP SINKS TO BE MOUNTED ACCORDING TO ADA / MAAB RESTRICTIONS.
   - TOP OF RIM TO BE MOUNTED NO HIGHER THAN 34" A.F.F.
   - SINK BOWL DEPTH NOT TO EXCEED 6 1/2"
   - FAUCETS TO BE LEVER TYPE, MOUNTED NOT HIGHER THAN 46" A.F.F (COORD. W/ ARCHITECT)
   - ALL PIPES TO BE PROTECTED ACCORDING TO ADA / MAAB STANDARDS
5. SPRINKLER HEADS TO BE RELOCATED TO CENTER OF CEILING TILES AS BEST AS POSSIBLE. COORDINATE WITH ARCHITECT.
6. SMOKE DETECTORS / CARBON MONOXIDE DETECTORS TO BE INSTALLED AS REQUIRED.

PLAN TAG LEGEND

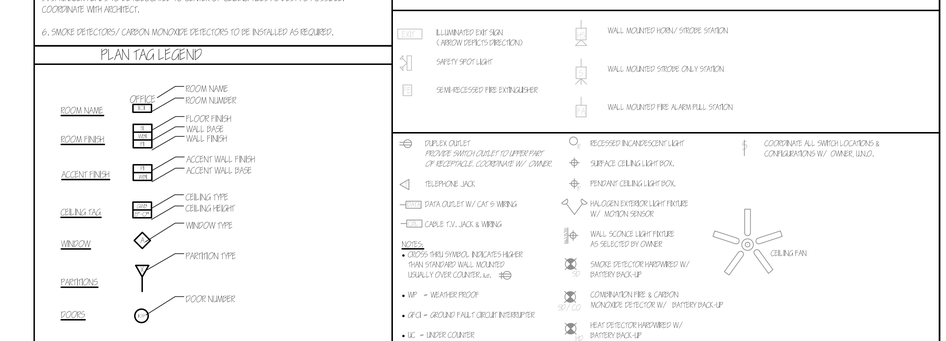
ROOM FINISH LEGEND

REFLECTED CEILING PLAN LEGEND

PLAN LEGEND:



A.F.F.	ABOVE FINISH FLOOR
ALUM.	ALUMINUM
B.O.B.	BOTTOM OF BRICK / BLOCK
B.O.C.	BOTTOM OF CONCRETE
B.O.F.	BOTTOM OF FINISH
B.O.M.	BOTTOM OF MASONRY
B.O.S.	BOTTOM OF STEEL
B.O.W.	BOTTOM OF WINDOW
CL(R).	CLEAR
CONC.	CONCRETE
CONT.	CONTINUOUS
COORD.	COORDINATE
DBL.	DOUBLE
DIA.	DIAMETER
D.L.O.	DAYLIGHT OPENING
EXIT	EXISTING TO REMAIN
EXIST.	EXISTING
EXG.	EXISTING
F.O.B.	FACE OF BRICK / BLOCK
F.O.C.	FACE OF CONCRETE
F.O.F.	FACE OF FINISH
F.O.M.	FACE OF MASONRY
F.O.S.	FACE OF STEEL
F.O.W.	FACE OF WINDOW
F.T.	FIRE TREATED
GA.	GAUGE
G.C.	GENERAL CONTRACTOR
HD	HEAVY DUTY
HDWD	HARDWOOD
MAX.	MAXIMUM
MIN.	MINIMUM
M.R.F.	MASONRY ROUGH OPENING
O.C.	ON CENTER
PKT.	POCKET
P.T.	PRESSURE TREATED
R.O.	ROUGH OPENING
SP.	SPANDREL
T&B	TOP & BOTTOM
T&G	TOUNGE & GROOVE
TBD	TO BE DETERMINED
T.B.	TOP OF BRICK / BLOCK
T.C.	TOP OF CONCRETE
T.D.	TOP OF DECK
T.W.	TOP OF WINDOW
T.M.	TOP OF MASONRY
T.S.	TOP OF STEEL
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
U.N.N.	UNLESS OTHERWISE NOTED
VIF	VERIFY IN FIELD
W/	WITH
WD.	WOOD
WWM	WOUND WIRE MESH
@	AT



REV#.	DESCRIPTION:	REV DATE:
		DRN BY: CSP / LSN
		SCALE: AS NOTED
		DATE: MAY 30, 2012

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PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE:
TYPICAL DETAILS, SCHEDULES, & LEGENDS

DRAWING NUMBER: A0.01

JOB#: 201209

GENERAL CONDITIONS

1. VERIFY ALL CONDITIONS. IF A CONFLICT ARISES, PLEASE NOTIFY THIS OFFICE AND THE OWNER FOR CLARIFICATION PRIOR TO PROCEEDING WITH ANY RELATED WORK.

2. EXISTING CONDITIONS - IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND THE SUBCONTRACTOR TO REVIEW ALL EXISTING CONDITIONS OF THE BUILDING AND TO INFORM THE ARCHITECT OF ANY DISCREPANCIES IN THE DOCUMENTS.

3. ALL GENERAL NOTES HEREIN ARE INTENDED TO WORK IN CONJUNCTION WTIH ENGINEERS GENERAL NOTES. IF A CONFLICT ARISES, THE GENERAL CONTRACTOR WILL ASSUME THE GREATER OF THE REQUIREMENTS SHALL BE IMPLIED AND WILL INSTALL THE MORE EXPENSIVE/EXPANSIVE METHOD OF INSTALLATION AND MATERIAL.

4. ALL DIMENSIONS SHOWN ARE TO FACE OF STUD UNLESS NOTED OTHERWISE.

5. THE OWNER WILL SELECT ALL FINISH MATERIALS INCLUDING CERAMIC TILE, FIXTURES, LIGHT FIXTURES, CABINETS, ETC.
IF CONTRACTOR WISHES TO SUBSTITUTE AN ITEM, IT MUST FIRST BE APPROVED BY THE OWNER AND THE ARCHITECT.

6. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING HIS/HER BEST SKILL AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER HIS/HER CONTROL.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACTS AND OMISSIONS OF ALL HIS/HER/HER EMPLOYEES AND ALL SUBCONTRACTORS, THEIR AGENTS AND EMPLOYEES, AND ALL OTHER PERSONS PERFORMING ANY OF THE WORK UNDER HIS/HER CONTRACT.

8. THE CONTRACTOR SHALL AT ALL TIMES ENFORCE STRICT DISCIPLINE AND GOOD ORDER AMONG HIS/HER EMPLOYEES AND SHALL NOT EMPLOY ON THE WORK ANY UNFIT PERSON OR ANYONE NOT SKILLED IN THE TASK ASSIGNED TO HIM/HER.

9. THE CONTRACTOR SHALL SECURE ALL PERMITS, FEES AND LICENSES NECESSARY FOR THE EXECUTION OF THE WORK.

SITE REVIEW

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VISIT THE SITE BEFORE SUBMITTING A BID. NO EXTRA COMPENSATION WILL BE RECOGNIZED FOR DIFFICULTIES IN THE EXECUTION OF HIS/HER CONTRACT.

COORDINATION

1. ALL PHASES OF HIS/HER CONTRACT SHALL BE SCHEDULED AND COORDINATED WITH THE OWNER WHO SHALL AT ALL TIMES HAVE ACCESS TO THE WORK WHEREVER IT IS IN PREPARATION AND PROGRESS. PRIOR NOTICE SHALL NOT BE REQUIRED FOR ANY VISIT.

2. NO EQUIPMENT OR SYSTEMS SHALL BE SHUT DOWN WITHOUT THE ADEQUATE NOTICE TO THE OWNER, OR HIS/HER AUTHORIZED REPRESENTATIVE. FINAL DECISION ON SHUTDOWN SHALL REST WITH THE OWNER OR HIS/HER AUTHORIZED REPRESENTATIVE. OFF HOUR SHUTDOWNS SHALL BE NEGOTIATED.

DIMENSIONING

1. THE DIMENSIONS AND CONDITIONS SHOWN ON THESE DRAWINGS ARE ASSUMED BY THE ARCHITECT BASED ON AVAILABLE INFORMATION. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS ON THE JOB SITE AND NOTIFY THE ARCHITECT OF ANY DEVIATION FROM THESE DRAWINGS.

2. THE CONTRACTOR SHALL PROVIDE A COMPLETE LAYOUT ON THE JOB SITE, THE CONTRACTOR IS TO NOTIFY THE ARCHITECT ON ALL LAYOUT CONFLICTS PRIOR TO INSTALLATION OF PARTITIONS OR EQUIP.

3. WHERE NO DIMENSION OR METHOD OF DETERMINING A LOCATIONS IS GIVEN, VERIFY THE CORRECT LOCATION WITH THE ARCHITECT PRIOR TO INSTALLATION.

GENERAL PROJECT NOTES:

1. THE DRAWINGS ARE NOT TO BE SCALED, THE GENERAL CONTRACTOR IS TO REFER TO THE DIMENSIONS INDICATED OR THE ACTUAL SIZES OF CONSTRUCTION ITEMS. WHERE NO DIMENSION OR METHOD OF DETERMINING A LOCATION IS GIVEN VERIFY CORRECT LOCATION WITH THE ARCHITECT PRIOR TO INSTALLATION.

2. THE DRAWINGS AND REFERENCED DETAILS HAVE BEEN DIMENSIONED IN ORDER TO ESTABLISH THE CONTROL AND GUIDELINES FOR FIELD LAYOUT. WHERE A DISCREPANCY EXISTS BETWEEN THE DRAWING AND THE DETAIL THE CONTRACTOR SHALL NOTIFY THE ARCHITECT FOR CLARIFICATION PRIOR TO INSTALLATION.

3. INTERIOR DETAILS ARE KEYED TO THE PLANS AT TYPICAL LOCATIONS. THE DETAILS APPLY TO ALL LOCATIONS WHICH ARE NOT KEYED IN AND ARE OF THE SAME CONSTRUCTION AND SCOPE OF WORK. THE CONTRACTOR AND SUBCONTRACTOR ARE RESPONSIBLE TO COORDINATE THE LOCATION OF ALL TYPICAL DETAILS AND INSTALL THE WORK INDICATED. IF DISCREPANCIES EXIST OR CLARIFICATION IS REQUIRED THE CONTRACTOR IS TO NOTIFY THE ARCHITECT TO OBTAIN CLARIFICATION.

4. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY VARIATION IN FIELD LAYOUT WHICH WILL NOT ACCOMMODATE THESE REGULATIONS PRIOR TO ANY FIELD INSTALLATION.

SHOP DRAWINGS:

1. SHOP DRAWINGS ARE DRAWINGS, DIAGRAMS, SCHEDULES, MATERIALS LISTS, AND OTHER DATA SPECIALLY PREPARED FOR THE WORK BY THE GENERAL CONTRACTOR OR ANY SUBCONTRACTOR, MANUFACTURER, SUPPLIER OR DISTRIBUTOR TO ILLUSTRATE SOME PORTION OF THE WORK. CONTRACT DRAWINGS ARE NOT TO BE REPRODUCED FOR USE AS SHOP DRAWINGS.

2. SHOP DRAWINGS SHALL BE SUBMITTED AS A COMPLETE SET, NOT IN A PIECEMEAL MANNER INCOMPLETE SHOP DRAWINGS SUBMITTALS WILL NOT BE REVIEWED AND WILL BE REJECTED.

3. NO PORTION OF THE WORK REQUIRING SUBMISSION OF A SHOP DRAWING SHALL BE STARTED UNTIL THE SUBMITTAL HAS BEEN SATISFACTORILY REVIEWED BY THE ARCHITECT AND CONSULTANTS. ALL SUCH PORTIONS OF THE WORK SHALL BE IN ACCORDANCE WITH FINAL REVIEW SUBMITTALS AND THE CONTRACT DOCUMENTS.

4. THE CONTRACTOR SHALL REVIEW, APPROVE AND SUBMIT ALL SHOP DRAWINGS REQUIRED BY THE CONTRACT DOCUMENTS IN AN ORDER THAT IS SEQUENTIAL WITH THE PROGRESS OF THE WORK AND CONSISTENT WITH THE LEAD TIMES RELATED TO THE PRODUCTS. THE SHOP DRAWINGS SUBMITTAL SCHEDULE SHALL INCLUDE ADEQUATE TIME FOR A COMPLETE AND PROFESSIONAL REVIEW BY ALL PARTIES INVOLVED. IT SHALL BE NOTED THAT REVIEW TIME WILL VARY DEPENDING ON THE SIZE AND CONTENT OF THE SUBMITTAL. BY APPROVING AND SUBMITTING SHOP DRAWINGS, THE CONTRACTOR REPRESENTS THAT HE HAS VERIFIED ALL MATERIALS, FIELD MEASUREMENTS, AND FIELD CONSTRUCTION CRITERIA RELATED THERETO, OR WILL DO SO. IN ADDITION, HIS/HER SUBMISSION SHALL REPRESENT THAT HE/SHE HAS CHECKED AND COORDINATED THE INFORMATION CONTAINED WITHIN SUCH SUBMITTALS WITH THE REQUIREMENTS OF THE WORK AND OF THE CONTRACT DOCUMENTS. THE ARCHITECT RESERVES THE RIGHT TO RETURN ANY SHOP DRAWINGS WHICH ARE JUDGED TO BE "RUBBER STAMP APPROVED" BY THE CONTRACTOR WITHOUT PROPER REVIEW AND EVALUATION.

5. THE CONTRACTOR SHALL NOT BE RELIEVED OF RESPONSIBILITY FOR ANY DEVIATION FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AS A RESULT OF THE ARCHITECT'S REVIEW OF THE SHOP DRAWINGS UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE ARCHITECT IN WRITING OF SUCH DEVIATION AT THE TIME OF SUBMISSION, AND THE ARCHITECT HAS GIVEN WRITTEN ACCEPTANCE TO THE SPECIFIC DEVIATION. THE CONTRACTOR SHALL NOT BE RELIEVED FROM THE RESPONSIBILITY FOR ERRORS OR OMISSIONS IN THE SHOP DRAWINGS BY THE ARCHITECTS REVIEW THEREOF.

6. THE CONTRACTOR SHALL DRAW ATTENTION TO ALL DEVIATIONS FROM THE CONTRACT DRAWINGS AND INCLUDE REASONS FOR SUCH DEVIATIONS WITH THE SUBMITTED SHOP DRAWINGS. IN ADDITION, THE CONTRACTOR SHALL DIRECT SPECIFIC ATTENTION, IN WRITING OR ON RESUBMITTED SHOP DRAWINGS, TO REVISIONS OTHER THAN THOSE REQUESTED BY THE ARCHITECT ON PREVIOUS SUBMITTALS.

GENERAL FINISHES NOTES:

1. THE CONTRACTOR AND SUBCONTRACTOR SHALL SUBMIT PRODUCTS AND FINISHES AS INDICATED IN THE DOCUMENTS. THE DECISION TO ACCEPT ANY SUBSTITUTIONS SHALL BE THE RESPONSIBILITY OF THE OWNER AND THE ARCHITECT.

2. ALL FLOORING INSTALLATIONS REQUIRE LOW V.O.C. EMISSION ADHESIVE. CONSULT MANUFACTURERS FOR PRODUCT RECOMMENDATIONS.

3. PROVIDE METAL ANGLE EDGE AT ALL CARPET & TILE TRANSITIONS. TO BE STAINLESS STEEL MANUFACTURED BY SCHLUTER OR EQUIVALENT. FOR STRIP HEIGHT CONFORM TO FIELD CONDITIONS

4. VINYL BASE SHALL RUN CONTINUOUS AND FULLY SURROUND CABINET BASES ON ALL EXPOSED SIDES, UNLESS INDICATED OTHERWISE. VINYL BASE VB1, TO BE 4" VINYL COVE BASE, ARCHITECT TO SELECT FROM STANDARD COLOR SELECTION.

5. GWB1 CEILING FINISH TO BE 5/8" GWB ON STEEL CEILING STRUCTURE. FACE OF SOFFIT TO MATCH GWB1. ACT1 TO BE 24"X48" ACCOUSTICAL CEILING TILE & GRID. PROFILES TO BE SELECTED BY ARCHITECT.

PAINT:

1. ALL PAINTED DOORS AND DOOR FRAMES SHALL RECEIVE SEMI GLOSS FINISH. REFER TO MANUFACTURERS SPECIFICATIONS AND RECOMMENDATIONS.

2. ALL WALLS, CELINGS, DOORS, AND DOOR FRAMES PAINTED WITH A LATEX PAINT SHALL HAVE A HIGH GLOSS OR OTHERWISE WASHABLE FINISH ACCEPTABLE BY THE BOARD OF HEALTH. SEE MANUFACTURERS SPECIFICATIONS AND RECOMMENDATIONS.

3. THE PAINTING CONTRACTOR SHALL PROVIDE FIELD MOCK-UP PAINTED WALL(S) OF THE PRIMARY AND ADJACENT PAINT COLORS FOR REVIEW AND APPROVAL OF THE OWNER AND ARCHITECT.

4. THE PAINTING CONTRACTOR SHALL ENSURE THAT ALL PAINTS COMPLY WITH THE CURRENT STANDARDS FOR V.O.C. EMISSIONS.

5. ALL PAINTED HOLLOW METAL DOOR & WINDOW FRAMES ARE TO RECEIVE SPRAY APPLICATION, NOT BRUSHED.

6. ALL VERTICAL AND HORIZONTAL DUCTS, PIPES, CONDUIT, ETC. (WHETHER SHOWN OR NOT) IN FINISHED ROOMS SHALL BE FURRED IN AND FINISHED TO MATCH ADJACENT FINISHED SURFACES AND ANY REQUIRED WALL OR CEILING FIRE RATING.

7. ALL ELECTRICAL PANELS IN THE CORRIDOR SHALL BE PAINTED TO MATCH THE ADJACENT WALL FINISH AND SHALL BE INSTALLED FLUSH WITH ADJACENT WALL SURFACES.

MILLWORK & CASEWORK:

1. SPECIES OF WOOD, WOOD VENEERS AND MILLWORK ARE TO BE DETERMINED. SEE MILLWORK DESCRIPTIONS.
2. ANY BLOCKING REQUIRED FOR MILLWORK TO BE FIRE RETARDANT.
3. ALL BACKSPLASHES SHOULD BE SET IN CAULKING AT ALL WET COUNTER LOCATIONS. PLYWOOD SUBSTRATE SHOULD BE USED AT ALL WET COUNTER LOCATIONS (PARTICLE BOARD IS NOT ACCEPTABLE AT SINK LOCATIONS).
4. ALL COUNTERS TO HAVE A BACKER SHEET.
5. AT ALL APPLIED TRIM FILL NAIL HOLES & REMOVE BLEMISHES FROM INSTALLATION. ALL CUT INS FOR SINK ARE TO BE APPLIED IN THE FIELD WITH PROPER TEMPLATES PROVIDED BY GENERAL CONTRACTOR.
6. ALL WOOD BLOCKING SOLID LUMBER AND PLYWOOD SHALL BE FIRE RETARDANT TREATED.

REV#:	DESCRIPTION:	REV DATE:

JFF DESIGN
ARCHITECTS & PLANNERS
VC.781-899-6908
FAX 781-899-3050
EMAIL: ARCHITECTS@JFFDESIGN.COM
24 WARWICK AVENUE
WALTHAM, MA 02452

DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE: GENERAL NOTES

DRAWING NUMBER: A0.02

JOB#: 201205

DIVISION 1 – GENERAL REQUIREMENTS

01010 – SUMMARY OF WORK

1. These drawings are intended to accompany the specifications for Chef's Kitchen, Cosmetology Lab & Title IX Locker Room, Waltham High School, 617 Lexington Street, Waltham, MA 02452

01050 - FIELD ENGINEERING

Part 1 – GENERAL

1. Existing utilities & equipment - The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning the work, investigate and verify the existence and location of underground utilities and other construction. Contact local utilities, and comply with all "Dig-Safe" requirements.

DIVISION 3 – CONCRETE

03300 – CAST-IN-PLACE CONCRETE

Part I – GENERAL

1. Coordinate all slab penetrations with Architect, Plumbing, Mechanical, Electrical Engineers and local agencies.
2. No pipe shall pass through concrete without permission of the Architect. Steel Pipe sleeves shall be provided and spaced a minimum of 3 diameters apart.
3. All reinforcing bars shall conform to ASTM A615, Grade 60 (Deformed), except where bars are to be welded use ASTM A706, Grade 60.
4. Lap all continuous bars in accordance with the "Development Length and Splice Table" on A0.01
5. All welded wire fabric (W.W.F.) shall conform to ASTM A185. Lap 2 squares at all joints and tie @ 3'-0" O.C.
6. Clear Concrete Protection for Reinforcing: (Unless Otherwise Noted).
   a. Slabs-on-grade: 1" from top (U.N.O)
   b. Slabs-on-deck: 1" from top (U.N.O)
7. No bars shall be cut or omitted in the field because of sleeves, duct openings or recesses. Bars may be moved aside without change in level and with the approval of the Architect.
8. All conduit shall run above the bottom reinforcing, below top reinforcing, and inside beam stirrups and wall reinforcing. Lines of conduit shall be spaced not closer than three conduit diameters on center. Maximum size of conduit in slab shall be equal to 1/3 of the slab thickness.
9. The contractor shall submit shop drawings showing the complete layouts of all control joints, construction joints, and isolation joints for slabs-on-grade and slabs on steel decks. Concrete placement shall not proceed until these drawings have been reviewed by the Architect.
10. Details not shown on the drawings shall be in accordance with the latest edition of the ACI Detailing Manual 315.

Part II – PRODUCTS

1. Epoxy Grout, Non-Shrinking: Premixed ferrous or non-ferrous, mixed and applied in accordance with manufacturer's recommendations. Grout shall show no settlement or vertical drying shrinkage at 3 days or thereafter based on initial measurement made at time of placement, and produce a compressive strength of at least 5,000 psi at 3 days. All concrete in the Cosmetology Lab and Title IX Locker Room shall be non-shrink grout.
2. Unless otherwise indicated, all other concrete shall be a mix designed for ultimate strength concrete in accordance with ACI 211.1 to achieve a 28 day compressive strength of 4000 psi for slabs-on-grade and 3000 psi for slabs on steel form decking.

Part III – EXECUTION

1. Remove water from excavations before concrete is deposited. Remove hardened concrete, debris and other foreign materials from interior of forms, and from inside of mixing and conveying equipment. Obtain approval of Architect before placing concrete. Provide screeds at required elevations for concrete slabs.
2. Before depositing new concrete on or against concrete which has set, existing surfaces shall be roughened and cleaned free from all laitance, foreign matter, and loose particles.
3. Convey concrete from mixer to final place of deposit by method which will prevent segregation or loss of ingredients. Do not deposit in work concrete that has attained its initial set or has contained its water or cement more than 1-1/2 hours. Do not allow concrete to drop freely more than 5 feet in unexposed work nor more than 3 feet in exposed work. Place and consolidate concrete in horizontal layers not exceeding 12 inches in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Vibration shall be carried on continuously with placing of concrete.
4. Immediately after forms have been removed and work has been examined and approved by Architect, remove loose materials, and patch all stone pockets, surface honeycomb, or similar deficiencies with cement mortar made with 1 part portland cement and 2 to 3 parts sand.
5. Slab Finishes shall be steel trowel finish: Applied toppings, concrete surfaces to receive resilient floor covering or carpet, future floor roof and all monolithic concrete floor slabs exposed in finished work and for which no other finish is shown or specified shall be steel troweled. Final steel troweling to secure a smooth, dense surface shall be delayed as long as possible, generally when the surface can no longer be dented with finger. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure on trowel to compact cement paste and form a dense, smooth surface. Finished surface shall be free of trowel marks, uniform in texture and appearance. Finish in the Title IX Locker Room shall match existing adjacent. Edges of existing slabs shall be ground for smooth transition and patched as required.

DIVISION 4 – MASONRY

04200 – UNIT MASONRY

Part I – GENERAL

1. EXPOSED BLOCK: All exposed concrete masonry shall be smooth face type to match existing and as selected by Architect. All exposed block shall be obtained from one single supplier and from the same lot for finish cohesiveness.
2. BLOCK BOND: All CMU and split faced block shall be layed in stacked bond to match existing.
3. BLOCK JOINTS: All CMU shall have consistent joints of 3/8" or match existing coursing.
4. Provide special shapes where required or indicated for lintel blocks, corners, jambs, sash, control joints, headers, and bond beams.
5. SUBMITTALS: Submit one 2'x4' sample panel. Panel shall include all finishes, color, and texture using same tools and techniques as for actual project.
6. WARRANTY: Submit copies of the manufacturer's limited warranty on materials.

Part III – EXECUTION:

1. All reinforced concrete masonry shall conform to the latest edition of the NCMA "Specification for the Design and Construction of non-load bearing Concrete Masonry".
2. Concrete Masonry Units shall conform to the ASTM C90, Grade N Type I, Normal Weight.
3. Concrete Masonry Units shall have an average minimum compressive strength of 2000psi on the net area, unless otherwise indicated on the plans or in the sections.
4. Mortar shall conform to ASTM C270, Type M or 2.
5. Grout shall conform to ASTM C476, fine type, and shall have a minimum 28 day compressive strength of 2500psi.
6. All reinforcing bars shall conform to ASTM A615, Grade 60, deformed.
7. Tolerances: From dimensions and locations in Contract Documents for plumb, level, and alignment, plus or minus 1/8 in 20'.
8. Fire-rating: Where indicated, provide assemblies identical to tested assemblies and accepted by authorities having jurisdiction.
9. Joints: Maintain uniform 3/8" width; tool concave. Provide full bed, head and collar joints except at full head weeps; keep cavity clean at cavity walls. Use mortar boards if required. Do not allow mortar to bleed over face of block.
10. Install masonry lintel block over all door and window locations and provide reinforcing within masonry lintels per structural schedule on drawings.
11. Ties and horizontal reinforcing: Comply with codes; ties shall be ladder type and spaced not more than 16" o.c. vertically.
12. Masonry cleaners:
   a. Job-mixed detergent solution: Solution of trisodium phosphate, 1/2 cup dry measure, and laundry detergent, 1/2 cup dry measure, dissolved in one gallon of water.
   b. Acidic cleaner:
      1. Manufacturer's standard strength of general purpose cleaner designed for new masonry surfaces of type indicated.
      2. Composed of blended organic and inorganic acids combined with special wetting systems and inhibitors.
      3. Expressly approved for intended use by manufacturer of masonry units being cleaned.
      4. Products - subject to compliance with requirements: ProSoCo, Inc. Model Sure Klean No. 600 Detergent.
   c. Clean masonry by bucket and brush method and follow recommendations of BIA. Obtain Architect's approval of materials and methods to be used. Clean 1/2 of sample panel and obtain Architect's approval before proceeding.

DIVISION 5 – METALS

05400 – LIGHT GAUGE STEEL FRAMING

Part I – GENERAL

1. All design, detailing, fabrication, and erection of light gauge framing shall be in accordance with American Iron and Steel Institute "Specifications For The Design of Cold-Formed Steel Structural Members", latest edition, and the manufacturer's details and specifications.
2. The owner will engage the services of a testing agency to perform structural tests and inspections for light gauge metal framing. The Contractor shall schedule all work to allow for the testing requirements to be completed.

Part II – PRODUCTS

1. Stud/track designations refer to Marino Ware Industries, Inc. with the following minimum design properties:

	Designation	Sx (in3)	Ix (in4)
a.	4" x 20 ga. stud (40CSJ20)	.335	.657
b.	4" x 18 ga. track (40CR18)	.336	.691
c.	6" x 18 ga. stud (60CSJ18)	.753	2.229
d.	6" x 18 ga. track (60CR18)	.594	1.816
e.	6" x 20 ga. stud (60CSJ20)	.584	1.729
f.	8" x 16 ga. stud (80CSJ16)	1.452	5.750
g.	8" x 16 ga. track (80CR16)	1.142	4.646
h.	8" x 16 ga. joist (8SW16)	1.445	5.780

2. All light gage framing shall be galvanized and shall conform to ASTM A-446grade D with a minimum yield stress of 33,000 psi for 18 ga components and 50,000 psi for components 16 ga and thicker.

Part III – EXECUTION

1. Headers shall bear on a single jack studs with two additional studs continuous by the header at each side of the opening.
2. Provide bridging per manufacturer's requirements. Note, bridging requirements may be more stringent when sheathing is not attached to both flanges.

DIVISION 6 – WOOD AND PLASTICS

06100 – ROUGH CARPENTRY

Part I – GENERAL

1. See Specifications

Part II – PRODUCTS

1. See Specifications

Part III – EXECUTION

1. See Specifications

06400 – ARCHITECTURAL WOODWORK

Part I – GENERAL

1. Provide finish carpentry and millwork for items exposed to view:
   a. Plastic laminate counters / tops as indicated.
2. Submit shop drawings showing detail construction of wood work for drawings, and as modified or revised to provide structural performance. Provide plans and elevations intended at minimum 1/2" = 1'-0" and details at minimum 3" = 1'-0".
3. Provide product data for all materials and finishes including items requiring treatment.
4. Samples: Provide minimum 2 samples 8" x 10" for all exposed finishes and materials. Submit samples of hardware, as requested by Architect.

Part II – PRODUCT

1. Quality standard for fabrication and products: Architectural Woodwork Institute Quality Standards, Premium grade unless noted otherwise.
2. Plastic laminate: AWI premium grade, NEMA LD-3, 0.050" horizontal grade laminate. Color as selected by Architect.

Part III – EXECUTION

1. Comply with AWI quality standards.
2. Install plumb, level, and straight with tight joints with no variations in flushness of adjoining surfaces; scribe work to fit.
3. Clean adjust and finish surfaces as required in this section. Refer to Division 9 for final finishes. Provide protection as required until substantial completion.

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07530 - SINGLE-PLY MEMBRANE ROOFING

Part I – GENERAL

1. Existing roof is recently completed. The roof is Sarnafill, "rhino bond – mechanically fastened" roofing.
2. General Contractor will contact Sarnafill field inspector to preview work to be performed on the newly installed roof for maintaining roof warranty.
3. All work on the roof will be performed by a licensed, certified Sarnafill roof installer.
4. All manufacturer's details shall be strictly adhered too.
5. All work to be inspected by Sarnafill field inspector to maintain / extend existing roof warranty for new work.
6. All new mechanical equipment will be installed using Sarnafill guidelines for weight distribution and coordination with insulation manufacturer's criteria. Coordinate with Architect / Engineer in field prior to installation.

DIVISION 8 – DOORS AND WINDOWS

08110 – STEEL DOOR FRAMES

Part I – GENERAL

7. General Contractors will provide steel door frames to match profile of existing door frames.
8. Use machine screws and metal expansion shields to secure hardware to concrete or solid masonry. Do not use fiber, plastic, and lead plugs or adhesives.
9. Hang doors and install hardware when concrete work, plastering and other operations have been completed which increase humidity and dust in building.

08210 – WOOD DOORS

Part I – GENERAL

1. General Contractors will provide wood doors to match existing doors.
2. The top edge of each door: Bearing an identification mark, either a stamp, brand or other indelible mark, giving the manufacturer's name, the door's trade name, the construction of the door, code date of manufacture and the quality.
3. The identification mark: Accompanied by either of the following additional requirements:
   a. An identification mark or a separate certification including the name of the inspection organization.
   b. Identification of the standards for the door, including glue type.
   a. Identification of preservative treatment for stile and rail doors.
   b. Identification of veneer and quality certification.
   c. The National Wood Window and Door Association Registered Hallmark edge stamp and glue bond mark plug.
4. Give top and bottom edges of doors two shop coats of water resistant sealer before sealing in shipping containers.

Part II – PRODUCTS AND MATERIALS

1. Wood doors to match existing school doors in type, wood species, profile and finish. Manufacturers: Lambton, Mohawk, Weyerhauser or "approved equal".
2. Solid Core Wood Flush Doors meeting requirements of AWI and NWWDA I.S.1 Series for Wood Flush Doors.
3. Type I or Type II bond for interior doors.
4. Solid wood or solid mat-formed wood particleboard core.
5. 1-3/4 inches thick, unless otherwise shown or specified.

Part III – FABRICATION AND INSTALLATION

1. Give top and bottom edges of doors two shop coats of water resistant sealer before sealing in shipping containers.
2. Clearances between Doors and Frames and Floors: Doors shall have a maximum 1/8-inch clearance at the jambs, heads, and meeting stiles, and a 3/4-inch clearance at the bottom, except as otherwise specified.
3. Bevel lock edge and meeting stile of single acting wood doors 1/8-inch for each 2 inches of door thickness.
4. Install door hardware (mounting heights) to comply with requirements of ADA and with recommendations of manufacturer.
5. Adjust Doors, including hardware to operate as designed without binding or deformation of the members.
6. Immediately after fitting and cutting of wood doors for hardware, seal edges of doors as specified in Section 09900, PAINTING.
7. Mortise wood doors for hardware using templates furnished under Section 08700, FINISH HARDWARE.
8. Clean prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the manufacturer.
9. Protect doors and hardware from damage until completion of the project.
10. Publications listed below form a part of this specification. Publications are referenced in the text by the basic designation only.
   a. American National Standards Institute and Door and Hardware Institute (ANSI/DHI): Installation Guide for Doors and Hardware (1986)
   b. Americans with Disabilities Act (ADA): Guidelines.
   c. Massachusetts Architectural Access Barrier Regulations - 521 CMR (MAAB)

08700 – FINISH HARDWARE

Part I – GENERAL

1. General Contractors will provide all Builder's Hardware to match existing school hardware in finish and function. General Contractor will coordinate with Architect in field.
2. Hardware for application on metal and wood doors and frames shall be made to standard templates. Templates shall be furnished to the fabricator of these items in sufficient time so as not to delay the construction.

Part II – PRODUCTS AND MATERIALS

1. Match existing school hardware in manufacturer, finish and function.

Part III – FABRICATION AND INSTALLATION

1. Install hardware at the location (heights) specified.
2. Install in accordance with the manufacturer's printed instructions and ANSI/DHI Installation Guide for Doors and Hardware unless specified otherwise.
3. Drill and tap screw holes in steel frames and doors for surface mounted hardware.
4. Use shims only at hinges where required to provide uniform clearance and alignment of door. Cut shims from stainless steel sheet to same size as hinge.
5. Do not drive screws in place.
6. Carefully fit and securely attach hardware items to doors and frames.
7. Adjust Doors, including hardware to operate as designed without binding or deformation of the members.
8. After installation, clean surfaces, remove temporary labels, paint spots and other defacement.
9. Clean prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the manufacturer.

DIVISION 9 – FINISHES

09250 - GYPSUM DRYWALL SYSTEM

Part I – GENERAL

1. Furnish and install all drywall materials, accessories and products required to provide a complete installation, including interior partitions, soffits, fascias and gypsum wallboard used as substrates for other materials.
2. Installation of doors and frames.
3. Coordinate this Work with the RELATED WORK of others.
4. Application procedures & workmanship shall be in accordance with GA-216 and ASTM C840.

Part II – PRODUCTS AND MATERIALS

A. GYPSUM DRYWALL PANELS
   1. Moisture Resistant - for application in wet areas and for use as a substrate for areas designated to receive non-absorbent finish materials and similar products, use 5/8" thick gypsum wallboard equal to Gold Bond MR Fire-Shield G with green paper faces and tapered edges.
   2. Regular - 5/8" thick gypsum wallboard equal to Gold Bond regular gypsum wallboard.

B. JOINT TREATMENT 3 COATS MINIMUM
   1. Joint Tape – paper
   2. Joint Compound – fast hardening type equal to Gold Bond Sta-Smooth

C. ACCESSORIES
   1. Corner Beads – 1-1/8" x 1-1/8" galvanized metal, crimped to all wall board corners

Part III – FABRICATION AND INSTALLATION

A. Install system free of waves, buckles and unevenness.
B. EXPOSED TO VIEW – all joints, holes and depressions visible below the ceiling line shall be filled, floated, sanded smooth and made ready to receive paint primer
C. CONCEALED LOCATIONS – all joints, holes and depressions concealed above ceiling lines and behind permanent fixtures shall be filled and taped.
D. DRYWALL JOINTS – all joints shall be taped with a minimum of two coats of joint compound. All compound joints are to be wet-sanded only.
E. Erect pressed metal welded frames. Comply with SDI-105. Coordinate with masonry and other trades as required for installation of frames prior to erection of enclosing walls. Use minimum of 3 wall anchors and 1 clip angle floor anchor per jamb. Comply with NWMA I.S.-1 AND AWI quality standards. Pre-fit door to frame and pre-machine for hardware. Install doors with not more than 1/8" clearance at top and sides, 1/4" at bottom, except as otherwise indicated.
F. Clean, adjust, and protect doors as required until substantial completion.

09500 – ACOUSTICAL TREATMENT

Part I – GENERAL

1. Furnish and install all materials, accessories and products required to provide a complete installation for all suspended ceiling systems.
2. Coordinate this Work with the RELATED WORK of others.
3. Warranty
   A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
      a. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
      b. Grid System: Rusting and manufacturer's defects
      c. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.
   B. Warranty Period Humiguard:
      a. Acoustical panels: Ten (10) years from date of substantial completion.
      b. Grid: Ten (10) years from date of substantial completion.
      c. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.
   C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

Part II – PRODUCTS AND MATERIALS

1. Armstrong Ceiling Systems, 877-ARM-STRONG, ULTIMA-1912, Beveled Tegular - 24" X 48" – 3/4" Grid, white-fine fissured texture.

Part III – FABRICATION AND INSTALLATION

A. EXAMINATION
   1. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations. (Exception: HumiGuard Max Ceilings)

B. PREPARATION
   1. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
   2. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
      1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

C. INSTALLATION
   1. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
   2. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight.
   3. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
   4. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
   5. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

D. ADJUSTING AND CLEANING
   1. Replace damaged and broken panels.
   2. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.
      a. Ceiling Touch-Up Paint, (Item #5760, 8oz. bottles) (Item #5761, quart size cans), "global white" latex paint should be used to hide minor scratches and nicks in the surface and to cover field tegularized edges that are exposed to view.
   3. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

09900 – PAINTING

Part I – GENERAL

A. Interior Primer.
B. Interior Paint.

Part II – PRODUCTS AND MATERIALS

A. Acceptable Manufacturer: Benjamin Moore & Co., which is located at: 101 Paragon Drive, Montvale, NJ 07645; Toll Free Tel: 866-708-9181; Tel: 201-573-9600; Email: info@benjaminmoore.com; Web: www.benjaminmoore.com

B. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Compatibility: Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

D. MIXING AND TINTING
   a. Except where specifically noted in this section, all paint shall be ready-mixed and pre-tinted. Agitate all paint prior to and during application to ensure uniform color, gloss, and consistency.
   b. Thinner addition shall not exceed manufacturer's printed recommendations. Do not use kerosene or other organic solvents to thin water-based paints.
   c. Where paint is to be sprayed, thin according to manufacturer's current guidelines.

E. EXTERIOR PRIMERS - NEW CONSTRUCTION
   1. Concrete or Stucco:
      Alkyd:
      a. One (1) Coat - Fresh Start All Purpose Alkyd Primer #024 (MPI Listed Product, Category 45).
      Latex:
      a. One (1) Coat - Fresh Start 100% Acrylic Superior Primer #046 (MPI Listed Product Categories 6, 17, 39, 50, 137)
   2. Concrete Masonry Units:
      Latex:
      a. One (1) Coat - Super Craft Latex Block Filler #285 (MPI Listed Product, Category 4).
   3. Ferrous Metals:
      Alkyd:
      a. One (1) Coat - IronClad Alkyd Low Lustre Metal & Wood Enamel #C163 (MPI Listed Product, Category 79).
      b. One (1) Coat - Super Spec® HP D.T.M. Alkyd Semi-Gloss #P24 (MPI Listed Product, Category 81).
      Latex:
      a. One (1) Coat - Super Spec® HP Acrylic Metal Primer # P04 (MPI Listed Product, Category 107 and Category 134).
      b. One (1) Coat - Super Spec® HP D.T.M. Acrylic Gloss Enamel #P28 (MPI Listed Product, Category 114).
      c. One (1) Coat - Super Spec® HPD.T.M. Acrylic Semi-Gloss #P29 (MPI Listed Product, Category 141).
      Epoxy:
      a. One (1) Coat - Super Spec® HP Epoxy Mastic Coating #P45/P45-84 (MPI Listed
   4. Galvanized Metals:
      Latex:
      a. One (1) Coat - Fresh Start All Purpose 100% Acrylic Primer #023 (MPI Listed Product Categories 6, 17, 39 and 137).
      b. One (1) Coat - Super Spec® HP Acrylic Metal Primer #P04 (MPI Listed Product, Category 107 and Category 134).
      a. One (1) Coat - Super Spec® HP D.T.M. Acrylic Gloss Enamel #P28 (MPI Listed Product, Category 114).
      b. One (1) Coat - Super Spec® HPD.T.M. Acrylic Semi-Gloss #P29 (MPI Listed Product, Category 141).
   5. Aluminum:
      Latex:
      a. One (1) Coat - Super Spec® HP Acrylic Metal Primer #P04 (MPI Listed Product, Category 107 and Category 134).
      b. One (1) Coat - Super Spec® HP D.T.M. Acrylic Gloss Enamel #P28 (MPI Listed Product, Category 114).
      c. One (1) Coat - Super Spec® HP D.TM. Acrylic Semi-Gloss #P29 (MPI Listed Product, Category 141).
      d. One (1) Coat - Fresh Start All Purpose 100% Acrylic Primer #023 (MPI Listed Product Categories 6, 17, 39 and 137).
   6. Wood Surfaces:
      Alkyd:
      a. One (1) Coat - Fresh Start All Purpose Alkyd Primer #024 (MPI Listed Product, Category 45).
      b. One (1) Coat - Super Spec® Alkyd Exterior Primer #176 (MPI Listed Product, Category 7).
      Latex:
      a. One (1) Coat - Fresh Start All Purpose 100% Acrylic Primer #023 (MPI Listed Product Categories 6, 17, 39 and 137).
   7. Water Resistant Soffit Board and Ceiling Board:
      Alkyd:
      a. One (1) Coat - Fresh Start All Purpose Alkyd Primer #024 (MPI Listed Product, Category 45).
      b. One (1) Coat - Super Spec® Alkyd Exterior Primer #176 (MPI Listed Product, Category 7).

F. INTERIOR PRIMERS - NEW CONSTRUCTION
   1. Concrete, Stucco:
      Alkyd:
      a. One (1) Coat - Super Spec® Alkyd Enamel Undercoater & Primer Sealer C245 (MPI Listed Product, Category 45 and Category 46).
      Latex:
      a. One (1) Coat - Eco Spec® WB Interior Latex Primer #372.
   2. Concrete Masonry Units:
      Epoxy:
      a. One (1) Coat - Super Spec® HP Epoxy Mastic Coating #P45/P45-84 (MPI Listed
   3. Wood:
      Alkyd:
      a. One (1) Coat - Super Spec® Alkyd Enamel Undercoater & Primer Sealer #C245 (MPI Listed Product, Category 45 and Category 46).
      Latex:
      a. One (1) Coat - Eco Spec® WB Interior Latex Primer #372.
   4. Ferrous Metal:
      Alkyd:
      a. One (1) Coat - Super Spec® HP Alkyd Metal Primer #P06 (MPI Listed Product, Category 79).
      b. One (1) Coat - Super Spec® HP Universal metal Primer #P07 (MPI Listed Product, Category 135).
      c. One (1) Coat - Super Spec® HP D.T.M. Alkyd Semi-Gloss #P24 (MPI Listed Product, Category 81).
      Latex:
      a. One (1) Coat - Super Spec® Acrylic Metal Primer #P04 (MPI Listed Product, Category 107 and Category 134).
      b. One (1) Coat - Super Spec® HP D.T.M. Acrylic Gloss Enamel #P28 (MPI Listed Product, Category 114).

One (1) Coat - Super Spec® HP D.T.M. Acrylic Semi-Gloss #P29 (MPI Listed Product,

      a. Category 141).
      Epoxy:
      a. One (1) Coat - Super Spec® HP Epoxy Mastic Coating #P45/P45-84 (MPI Listed
   5. Galvanized Metal:
      Latex:
      1. One (1) Coat - Eco Spec® WB Interior Latex Primer #372.
   6. Gypsum Board, Plaster:
      Alkyd:
      a. One (1) Coat - Super Spec® Alkyd Enamel Under coater & Primer Sealer #C245 (MPI Listed Product, Category 45 and Category 46).
      Latex:
      a. One (1) Coat - Eco Spec® WB Interior Latex Primer #372
      b. One (1) Coat - Eco Spec® Interior Latex Primer Sealer #231 (MPI Listed Product, Category 149).

G. EXTERIOR PRIMERS - PREVIOUSLY PAINTED SURFACES
   1. Concrete, Masonry, Stucco:
      Alkyd:
      a. One (1) Coat - Fresh Start All Purpose Alkyd Primer # 024 (MPI Listed Product, Category 45).
      b. One (1) Coat - Super Spec® Alkyd Exterior Primer #176 (MPI Listed Product, Category 7).
      Latex:
      a. One (1) Coat - Fresh Start All Purpose 100 Percent Acrylic Primer # 023 (MPI Listed Product Categories 6, 17, 39 and 137).

H. INTERIOR PRIMERS - PREVIOUSLY PAINTED SURFACES
   1. Previously Painted:
      Alkyd:
      a. One (1) Coat – Advance Waterborne Interior Alkyd Primer #790 (MPI Listed Product, Category 172).
      b. One (1) Coat - Alkyd Enamel Underbody #C245 (MPI Listed Product, Category 45 and Category 46).
      Latex:
      a. One (1) Coat - Eco Spec® WB Interior Latex Primer #372

I. EXTERIOR FINISH COATS
   1. Flat Finish:
      Latex:
      a. Two (2) Coats - Aura® Waterborne Exterior Flat Finish #629. (MPI Listed Product, Category 10)
      b. Two (2) Coats – Super Spec® Masonry 100% Acrylic Elastomeric Coating Flat Finish #056 (MPI Listed Product, Category 113).
   2. Low Luster Finish:
      Alkyd:
      a. Two (2) Coats – IronClad® Alkyd Low Lustre Metal & Wood Enamel #C163 (MPI Listed Product, Category 79).
      Latex:
      a. Two (2) Coats - Aura® Waterborne Exterior Low Lustre Finish #634 (MPI Listed Product, Category 15).
   3. Satin Finish:
      Alkyd:
      a. Two (2) Coats- Deck & Siding Finishes - Alkyd Translucent #099
      Latex:
      a. Two (1) (2) Coats - Aura ® Exterior Satin #631.
   4. Soft/Medium Gloss Finish:
      Latex:
      a. One (1) or Two (2) Coats - Regal® Select Premium Exterior Soft Gloss Finish #N402 (MPI Listed Product, Category 11).
      b. Two (2) Coats - Super Spec® Latex House & Trim Paint #170.
      c. Two (2) Coats - Super Spec® 100% Acrylic House & Trim #183.
   5. Semi-Gloss Finish:
      Alkyd:
      a. Two (2) Coats - Super Spec® HP D.T.M. Alkyd Semi-Gloss #P24 (MPI Listed Product, Category 81).
      Latex:
      a. Two (2) Coats - Super Spec® D.T.M. Acrylic Semi - Gloss #P29 (MPI Listed Product, Category 141).
   6. High Gloss Finish:
      Alkyd:
      a. One (1) or Two (2) Coats – Advance Waterborne Interior/Exterior Alkyd High Gloss #N794 (MPI Listed Product, Categories 157, 157 X-Green).
      b. Two (2) Coats - Impervo Alkyd High Gloss Metal & Wood Enamel #C133 (MPI Listed Product, Category 9 and 48).
      c. Two (2) Coats - Porch and Floor Enamel #112.
      Latex:
      a. Two (2) Coats - Super Spec® HP Acrylic Gloss Enamel #P28 (MPI Listed Product, Category 114).

I. INTERIOR FINISH COATS
   1. Flat Finish:
      Alkyd:
      a. Two (2) Coats - Super Spec® Alkyd Calcimine Recoater #306 (MPI Listed Product, Category 49).
      b. Two (2) Coats - Super Spec® Sweep-Up Spray Alkyd Flat #151 (MPI Listed Product, Category 55).
      Latex:
      a. Two (2) Coats - Eco Spec® WB Interior Latex Flat # 373 (MPI Listed Product, Category 142).
   2. Eggshell Finish:
      Alkyd:
      a. Two (2) Coats – Dulamel® Eggshell Enamel #C305.
      Latex:
      a. Two (2) Coats - Eco Spec® WB Interior Latex Eggshell Finish# 374 (MPI Listed Product, Categories 52, 52-X Green, 139, 145, 145-X Green).
   3. Satin/Semi-Gloss Finish:
      Alkyd:
      a. Two (2) Coats - Super Spec® Alkyd Semi-Gloss Enamel #C271 (MPI Listed Product, Category 51).
      b. Two (2) Coats – Dulamel® Alkyd Semi-Gloss Finish #C207 (MPI Listed Product, Category 47).
      Latex:
      a. Two (2) Coats - Eco Spec® WB Interior Latex Semi-Gloss #376 (MPI Listed Product Categories 54, 54-X Green).
      Epoxy:
      a. Two (2) Coats - Super Spec® HP Acrylic Epoxy Semi-Gloss Coating #P43/P43-84 (MPI Listed Product, Category 215).
      b. Two (2) Coats - Super Spec® Acrylic Epoxy Gloss P43/P43-86
   4. High Gloss Finish:
      Alkyd:
      a. One (1) or Two (2) Coats – Advance Waterborne Interior/Exterior Alkyd High Gloss #N794 (MPI Listed Product, Categories 157, 157 X-Green).
      b. Two (2) Coats- Benjamin Moore Collection High Gloss Enamel #133 (MPI Listed Product, Category 48)
      c. Two (2) Coats - Super Spec HP® Urethane Alkyd Gloss #P22 (MPI Listed Product Categories 9, 48)
      Latex:
      a. Two (2) Coats - Super Spec® HP D.T.M. Acrylic Gloss Enamel #P28 (MPI Listed Product, Categories 114, 154).
      Epoxy:
      a. Two (2) Coats - Super Spec HP® Acrylic Epoxy Gloss #P43/P43-84 (MPI Listed Product, Category 215).

Part III – FABRICATION AND INSTALLATION

A. EXAMINATION
   1. Do not begin installation until substrates have been properly prepared.
   2. Ensure that surfaces to receive paint are dry immediately prior to application.
   3. Ensure that moisture-retaining substrates to receive paint have moisture content within tolerances allowed by coating manufacturer. Where exceeding the following values, promptly notify Architect and obtain direction before beginning work.
      a. Concrete and Masonry: 13 percent. Allow new concrete to cure a minimum of 28 days.
      b. Exterior Wood: 17 percent.
      c. Interior Wood: 15 percent.
      d. Interior Finish Detail Woodwork, Including Trim, and Casework: 10 percent.
      e. Plaster and Gypsum: 15 percent.
      f. Concrete Slab-On-Grade: Perform calcium chloride test over 24 hour period or other acceptable test to manufacturer. Verify acceptable moisture transmission and pH levels.
   4. Examine surfaces to receive coatings for surface imperfections and contaminants that could impair performance or appearance of coatings, including but not limited to, loose primer, rust, scale, oil, grease, mildew, algae, or fungus, stains or marks, cracks, indentations, or abrasions.
   5. Correct conditions that could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.

B. PREPARATION - GENERAL
   1. Clean surfaces thoroughly prior to coating application.
   2. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform, satisfactory appearance.
   3. Stains and Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely removed with isolating primer or sealer recommended by coating manufacturer to prevent bleed-through.
   4. Remove Mildew, Algae, and Fungus using materials and methods recommended by coating manufacturer.
   5. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
   6. Remove or protect adjacent hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items not indicated to receive coatings.
   7. Move or protect equipment and fixtures adjacent to surfaces indicated to receive coatings to allow application of coatings.
   8. Protect adjacent surfaces not indicated to receive coatings.
   9. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and indicated materials, using only methods and materials recommended by coating manufacturer.

C. SURFACE PREPARATION
   1. Concrete and Concrete Masonry: Clean surfaces free of loose particles, sand, efflorescence, laitance, form oil, curing compounds, and other substances which could impair coating performance or appearance.
   2. Concrete Floors: Remove contaminants which could impair coating performance or appearance. Verify moisture transmission and alkaline-acid balance recommended by coating manufacturer; mechanically abrade surface to achieve 80-100 grit medium-sandpaper texture.
   3. Existing Coatings:
      a. Remove surface irregularities by scraping or sanding to produce uniform substrate for coating application; apply one coat primer of type recommended by coating manufacturer for maximum coating adhesion.
      b. If presence of lead in existing coatings is suspected, cease surface preparation and notify Architect immediately.
   4. Gypsum Board: Repair cracks, holes and other surface defects with joint compound to produce surface flush with adjacent surfaces.
   5. Masonry Surfaces - Restored: Remove loose particles, sand, efflorescence, laitance, cleaning compounds and other substances that could impair coating performance or appearance.
   6. Metals - Aluminum, Mill-Finish: Clean and etch surfaces with a phosphoric acid-water solution or water based industrial cleaner. Flush with clean water and allow to dry, before applying primer coat.
   7. Metals - Copper: Clean surfaces with pressurized steam, pressurized water, or solvent washing.
   8. Metals - Ferrous, Unprimed: Remove rust or scale, if present, by wire brush cleaning, power tool cleaning, or sandblast cleaning; remove grease, oil, and other contaminants which could impair coating performance or appearance by solvent cleaning, with phosphoric-acid solution cleaning of welds, bolts and nuts; spot-prime repaired welds with specified primer.
   9. Metals - Ferrous, Shop-Primed: Remove loose primer and rust, if present, by scraping and sanding, feathering edges of cleaned areas to produce uniform flat surface; solvent-clean surfaces and spot-prime bare metal with specified primer, feathering edges to produce uniform flat surface.
   10. Metals - Galvanized Steel (not passivated): Clean with a water-based industrial strength cleaner, apply an adhesion promoter followed by a clean water rinse. Alternately, wipe down surfaces using clean, lint-free cloths saturated with xylene or lacquer thinner; followed by wiping the surface dry using clean, lint-free cloths.
   11. Metals - Galvanized Steel, Passivated: Clean with water-based industrial strength cleaner. After the surface has been prepared, apply recommended primer to a small area. Allow primer to cure for 7 days, and test adhesion using the "cross-hatch adhesion tape test" method in accordance with ASTM D 3359. If the adhesion of the primer is positive, proceed with a recommended coating system for galvanized metal.
   12. Metals - Stainless Steel: Clean surfaces with pressurized steam, pressurized water, or water-based industrial cleaner.
   13. Plaster: Repair cracks, holes and other surface defects as required to maintain proper surface adhesion. Apply patching plaster or Joint compound and sand to produce surface flush with adjacent undamaged surface. Allow a full cure prior to coating application as recommended by the patching compound manufacturer's recommendations.
   14. Polyvinyl Chloride (PVC) Pipe: remove contaminants and markings with denatured alcohol scuff sand and wipe with solvent for maximum adhesion. Test adhesion before starting the job.
   15. Fiberglass Doors - remove contaminants with cleaning solvent (alcohol) scuff sand and wipe. Test adhesion of primer before starting job.
   16. Textiles - Insulated Coverings, Canvas or Cotton: Clean using high-pressure air and solvent of type recommended for material.
   17. Wood:
   a. Seal knots, pitch streaks, and sap areas with sealer recommended by coating manufacturer; fill nail recesses and cracks with filler recommended by coating manufacturer; sand surfaces smooth.
   b. Apply primer coat to back of wood trim and paneling.
   18. Wood Doors: Seal door tops and bottoms prior to finishing.
   19. Wood Doors - Field-Glazed Frames and Sash: Prime or seal glazing channels prior to glazing.

D. APPLICATION - GENERAL
   1. Apply each coat to uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins, brush marks, roller marks, orange-peel, or other application imperfections are not permitted.
   2. Allow manufacturer's specified drying time, and ensure correct coating adhesion, for each coat before applying next coat.
   3. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).
   4. Remove dust and other foreign materials from substrate immediately prior to applying each coat.
   5. Where paint application abuts other materials or other coating color, terminate coating with a clean sharp termination line without coating overlap.
   6. Where color changes occur between adjoining spaces, through framed openings that are of same color as adjoining surfaces, change color at outside stop corner nearest to face of closed door.
   7. Re-prepare and re-coat unsatisfactory finishes; refinish entire area to corners or other natural terminations.

E. CLEANING
   1. Clean excess coating materials, and coating materials deposited on surfaces not indicated to receive coatings, as construction activities of this section progress; do not allow to dry.
   2. Re-install hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items that have been removed to protect from contact with coatings.
   3. Reconnect equipment adjacent to surfaces indicated to receive coatings.
   4. Relocate to original position equipment and fixtures that have been moved to allow application of coatings.
   5. Remove protective materials.

F. PROTECTION
   1. Protect completed coating applications from damage by subsequent construction activities.
   2. Repair to Architect's acceptance coatings damaged by subsequent construction activities. Where repairs cannot be made to Architect's acceptance, re-apply finish coating to nearest adjacent change of surface plane, in both horizontal and vertical directions.

DIVISION 10 – SPECIALTIES

10522 – FIRE EXTINGUISHERS

Part I – GENERAL

1. Obtain fire extinguishers from one source from a single manufacturer. Fire extinguishers shall be UL-listed & bear UL "Listing Mark" for type, rating and classification.
2. Provide fire extinguishers and mounting brackets at locations indicated and elsewhere as required by local authorities. Fire extinguishers shall comply with requirements of governing authorities.
3. Fire extinguishers to be provided by G.C. and installed by G.C. This specification is for information only.

102116 – SHOWER AND DRESSING COMPARTMENTS

Part 1 – GENERAL

1. General: Submit the following in accordance with Conditions of the Contract.
2. Product data for each type of product and process specified in this section, including fabrication, finishing, and installation.
3. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components
4. Protect Materials during transit, delivery storage, and handling to prevent damage, spoilage, and deterioration.

Part 2 – PRODUCTS

1. Acceptable System: Comptec / Capitol Shower Stalls or approved equal.
2. Pre-finished Color: Baked Enamel Finish, full line Architectural Color selections.
3. Manufacturer: Comptec / Capitol, or approved equal.
4. Complete fabrication, ready for field assembly, and hardware application, before shipment to project site to maximum extent possible.

Part 3 – EXECUTION

1. Before installation, examine shop fabricated work for completion and complete work as required, including removal of all packing material.
2. Quality Standard: Install metal panels to comply with manufacturer's requirements.
3. Install metal partitions, level, true, and straight with no distortions. Shim as required with concealed shims.
4. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Owner, that ensure the material is without damage or deterioration at time of Substantial Completion.

123216 – MANUFACTURED PLASTIC LAMINATE CLAD CASEWORK

Part 1 – GENERAL

1. General: Submit the following in accordance with the Conditions of the Contract.
2. Product data for each type of product and process specified in this section, including fabrication, finishing, and installation.
3. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components
4. General Contractor shall refer to Equipment Schedule located on Architectural sheet A5.03.
5. All Sub-Bidders (Filed Sub-Bids) shall refer to work associated with rough and final connections for all equipment indicated on equipment schedule.

Part 2 – PRODUCTS

1. Style / Wet Stations, Desk & Styling Chair manufacturer: Kaemark Salon Furnishings, or approved equal.
2. Shampoo bowl manufacturer: Belvedere, or approved equal.
3. Hood dryer manufacturer: Belvedere, or approved equal.
4. Facial Steamer: S&A, or approved equal.
5. Nail Table manufacturer: Kayline, or approved equal.
6. Fatigue Mat manufacturer: Unique Mat, or approved equal.
7. Complete fabrication, ready for field assembly, and hardware application, before shipment to project site to maximum extent possible.
8. Pre-finished Color: Plastic Laminate Finish, full line Architectural Color selections

Part 3 – EXECUTION

1. Before installation, examine shop fabricated work for completion and complete work as required, including removal of all packing material.
2. Quality Standard: Install metal panels to comply with manufacturer's requirements.
3. Install metal partitions, level, true, and straight with no distortions. Shim as required with concealed shims.
4. All final connections to be performed by Plumbing (Filed Sub-Bid) & Electrical (Filed Sub-Bid) Contractors as required for full unit operation.

REV#:
DESCRIPTION:
REV DATE:

JFF DESIGN
ARCHITECTS & PLANNERS

VC.781-899-6908
FAX 781-899-3050
EMAIL: ARCHITECTS@JFFDESIGN.COM

24 WARWICK AVENUE
WALTHAM, MA 02452

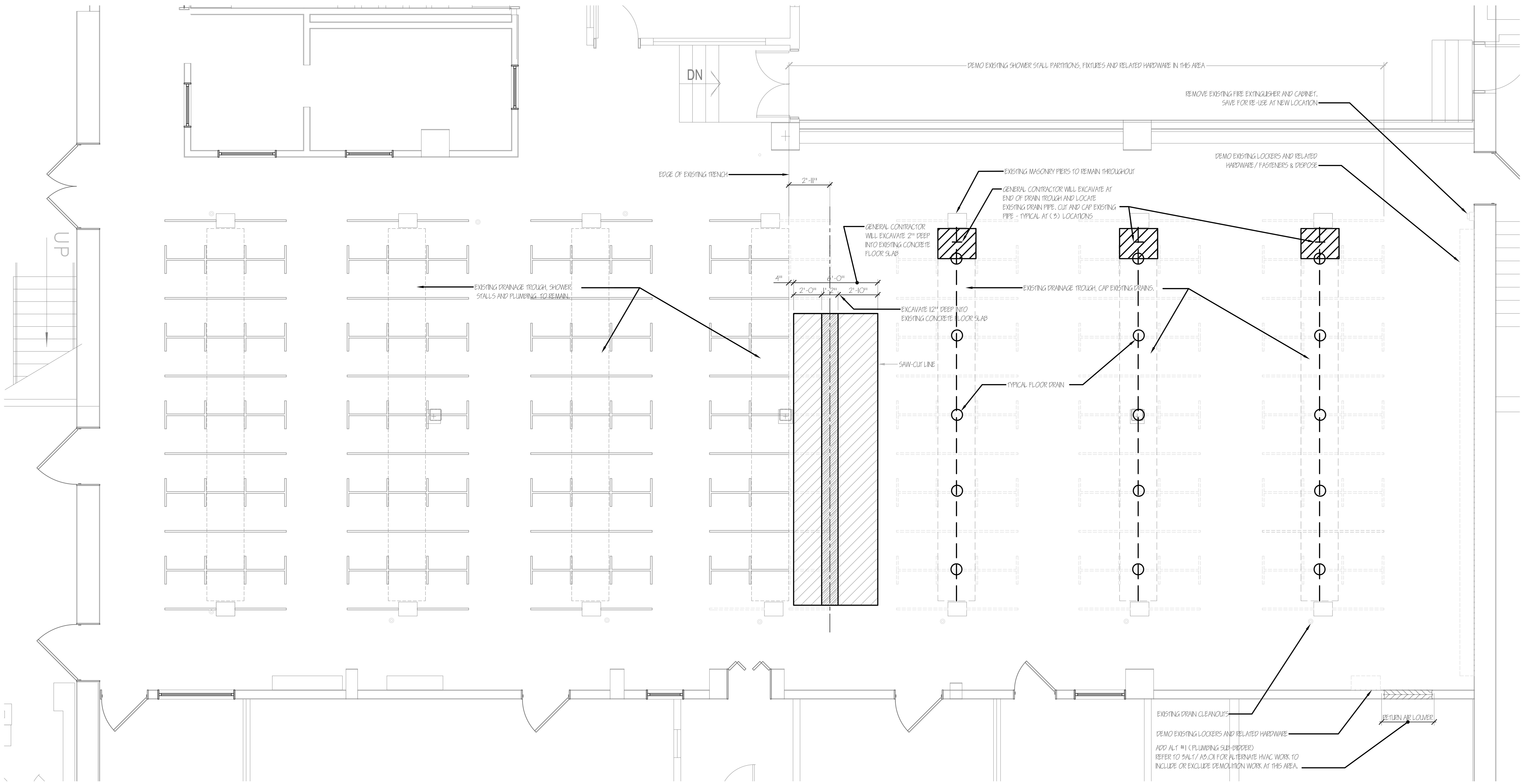
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

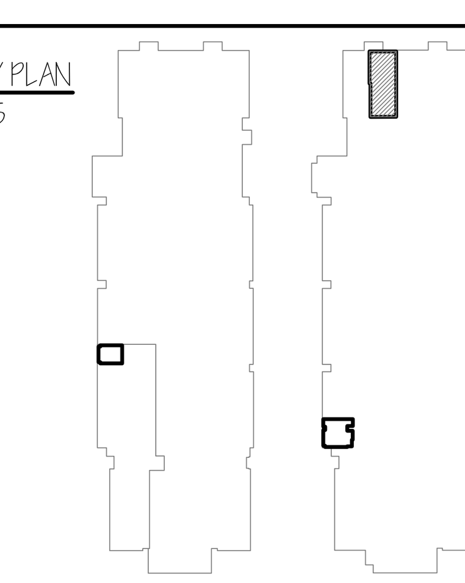
DRAWING NUMBER: A0.03

DRAWING TITLE: SPECIFICATIONS

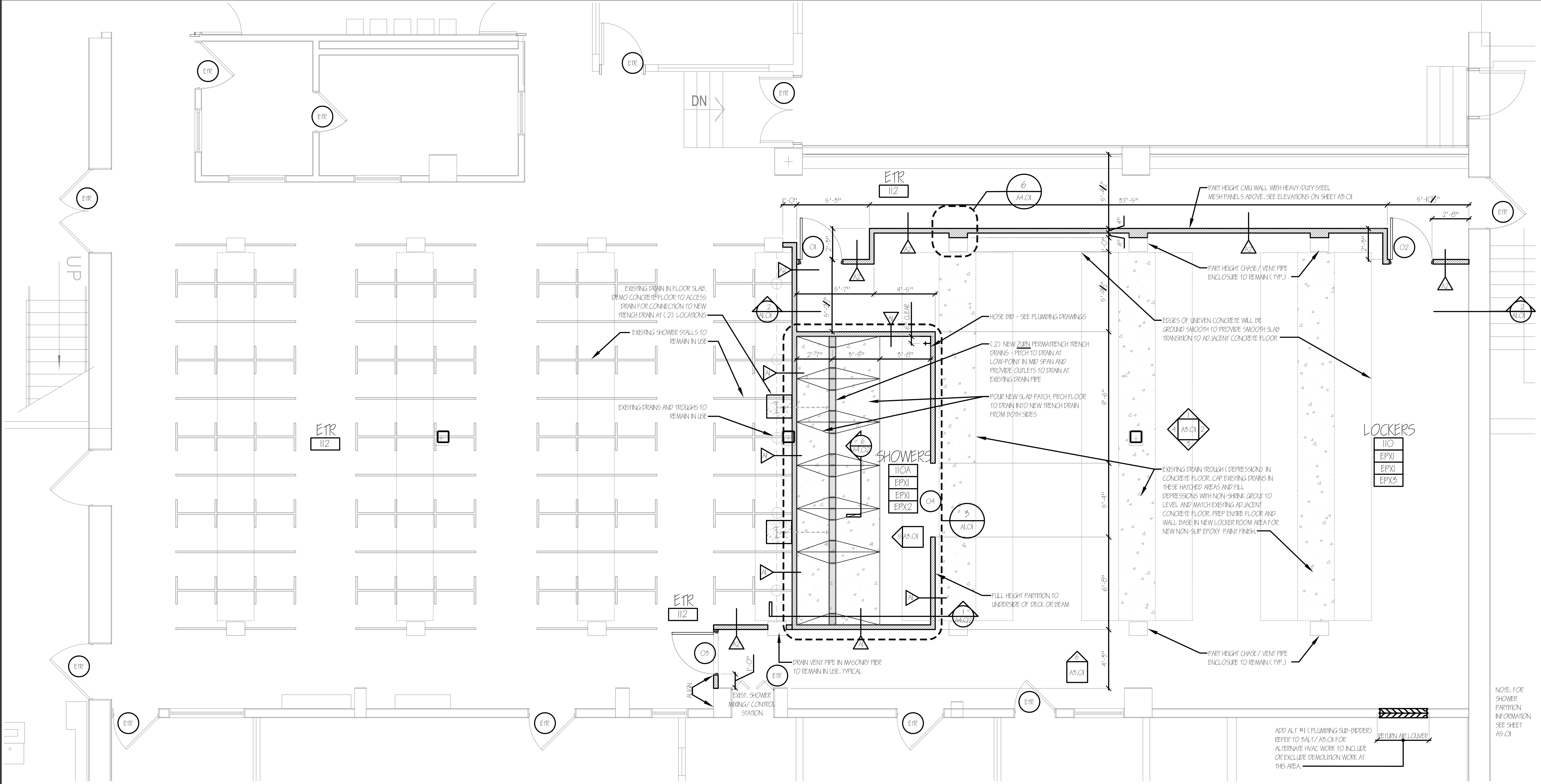
JOB#: 201205



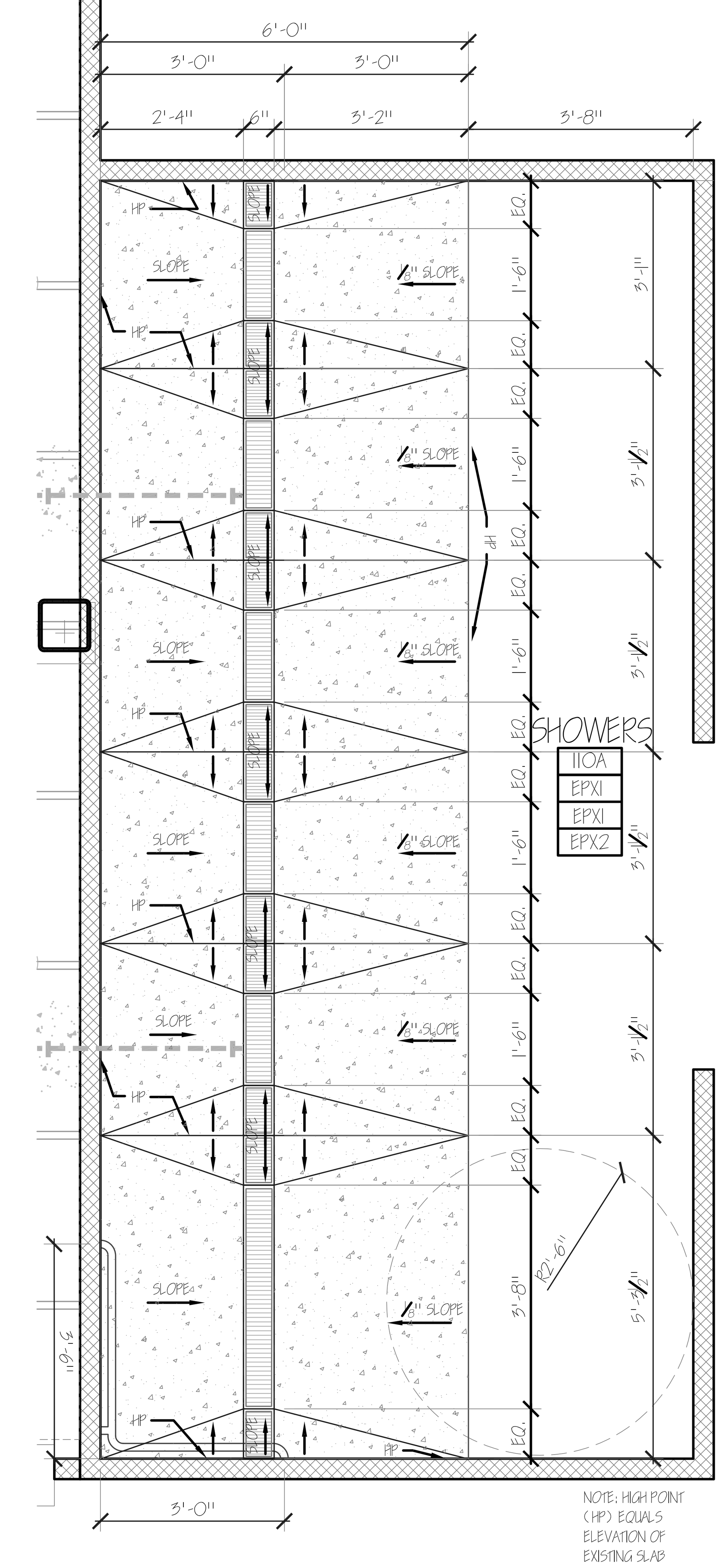
1 DEMOLITION PLAN
1/4"=1'-0"



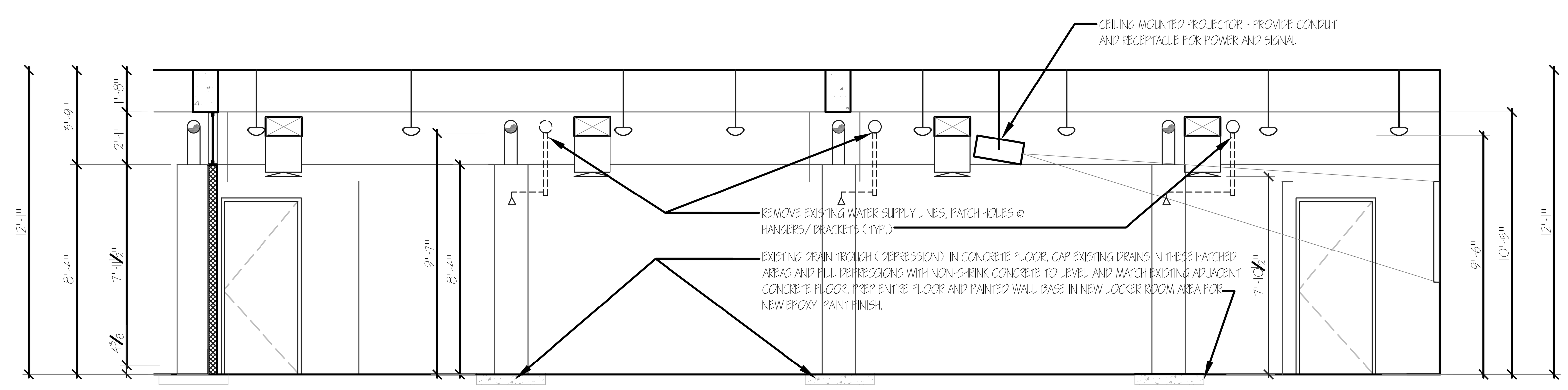
REV #:	DESCRIPTION:	REV DATE:
JFF DESIGN ARCHITECTS & PLANNERS VC.781-899-6908 FAX 781-899-3050 EMAIL: ARCHITECTS@JFFDESIGN.COM 24 WARWICK AVENUE WALTHAM, MA 02452		DRN BY: CSP / LSN SCALE: AS NOTED DATE: MAY 30, 2012
PROJECT:	WALTHAM HIGH SCHOOL CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM 617 LEXINGTON STREET WALTHAM, MA 02452	DRAWING NUMBER: AD.01
DRAWING TITLE:	DEMOLITION PLAN - TITLE IX LOCKER ROOM	
		JOB #: 201205



1 CONSTRUCTION PLAN
1/4"=1'-0"



3 ENLARGED CONSTRUCTION PLAN - SHOWERS
1/2"=1'-0"

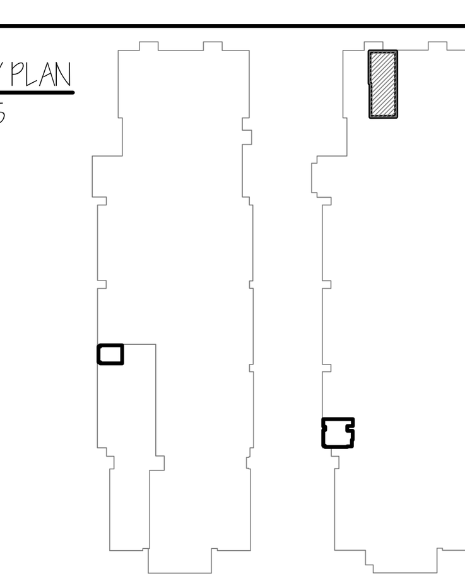


2 LOCKER ROOM SECTION
1/4"=1'-0"

ROOM FINISH SCHEDULE							
NAME	NUMBER	FLOOR FINISH	BASE FINISH	WALL FINISH	CEILING FINISH	CEILING HEIGHT	NOTES
GIRL'S VARSITY LOCKER ROOM	110	EPX1	EPX1	EPX3	EXISTING	EXISTING	
GIRL'S VARSITY SHOWERS	110A	EPX1	EPX1	EPX2	EXISTING	EXISTING	

FINISHES
EPX1: EPOXY PAINT (COLOR 1)
EPX2: EPOXY PAINT (COLOR 2)
EPX3: EPOXY PAINT (COLOR 3)

KEY PLAN
NTS



REV#: DESCRIPTION: REV DATE:

JFF DESIGN
ARCHITECTS & PLANNERS
VC.781-899-6908
FAX 781-899-3050
EMAIL: ARCHITECTS@JFFDESIGN.COM
24 WARWICK AVENUE
WALTHAM, MA 02452

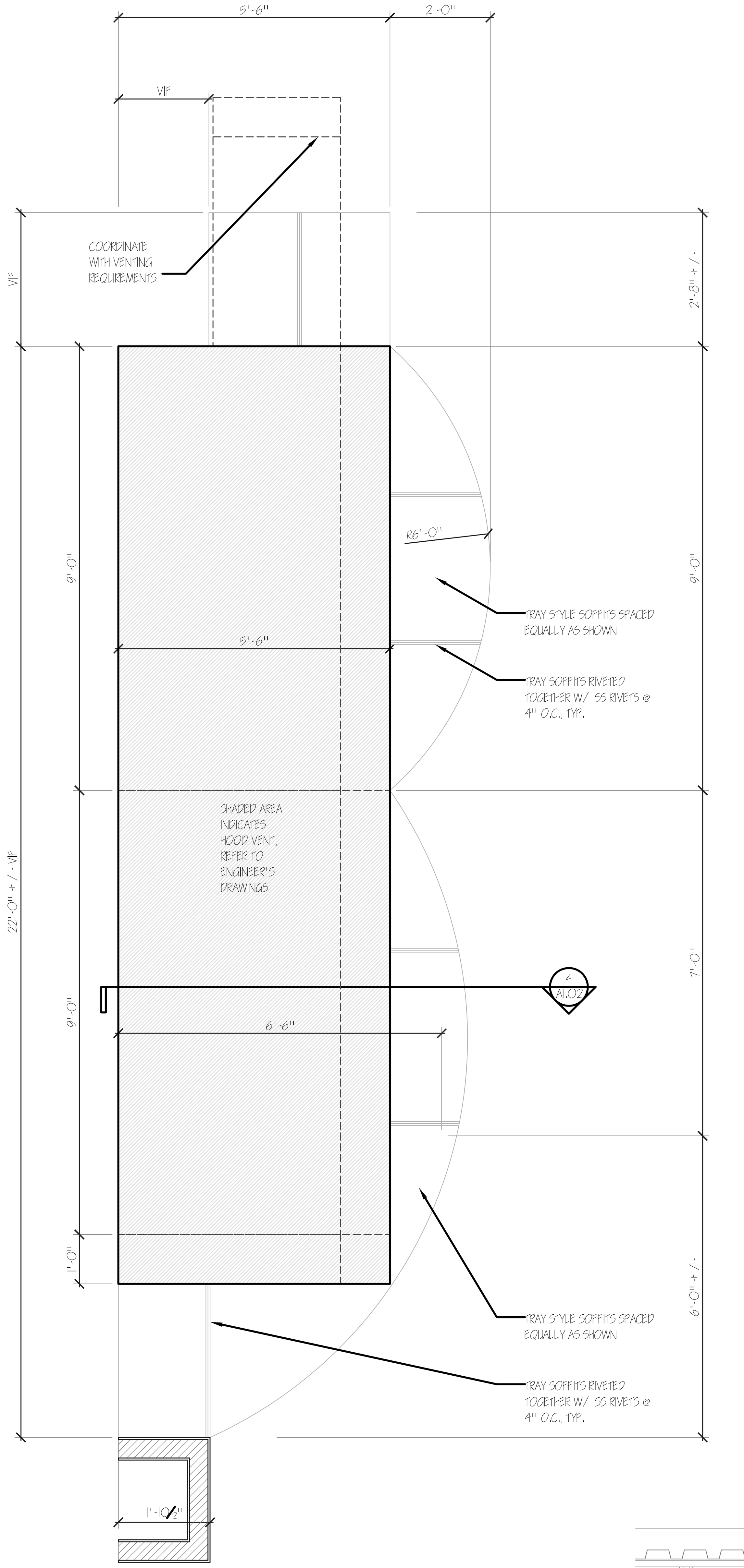
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

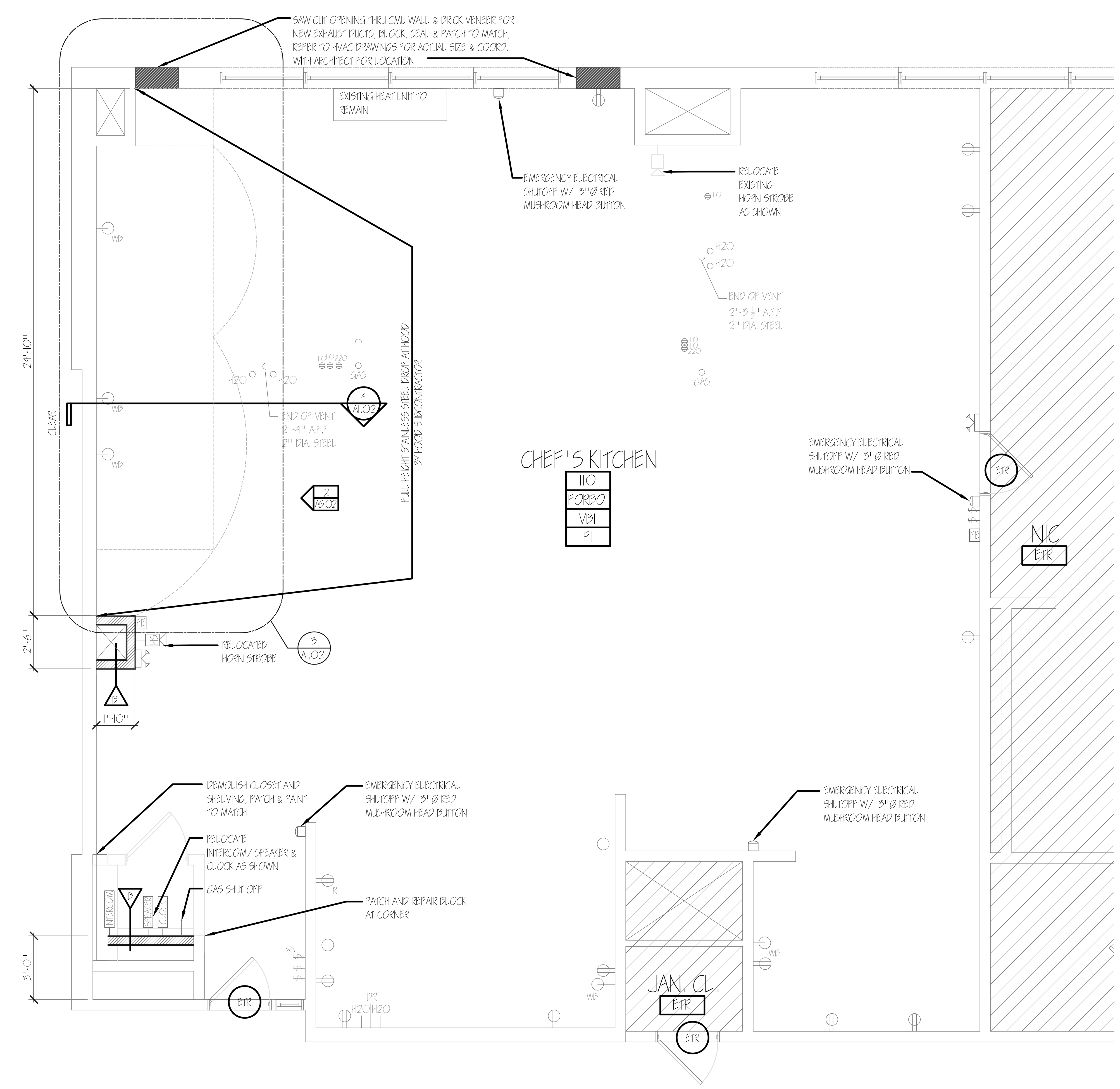
DRAWING NUMBER: A1.01

DRAWING TITLE: CONSTRUCTION PLAN - TITLE IX LOCKER ROOM

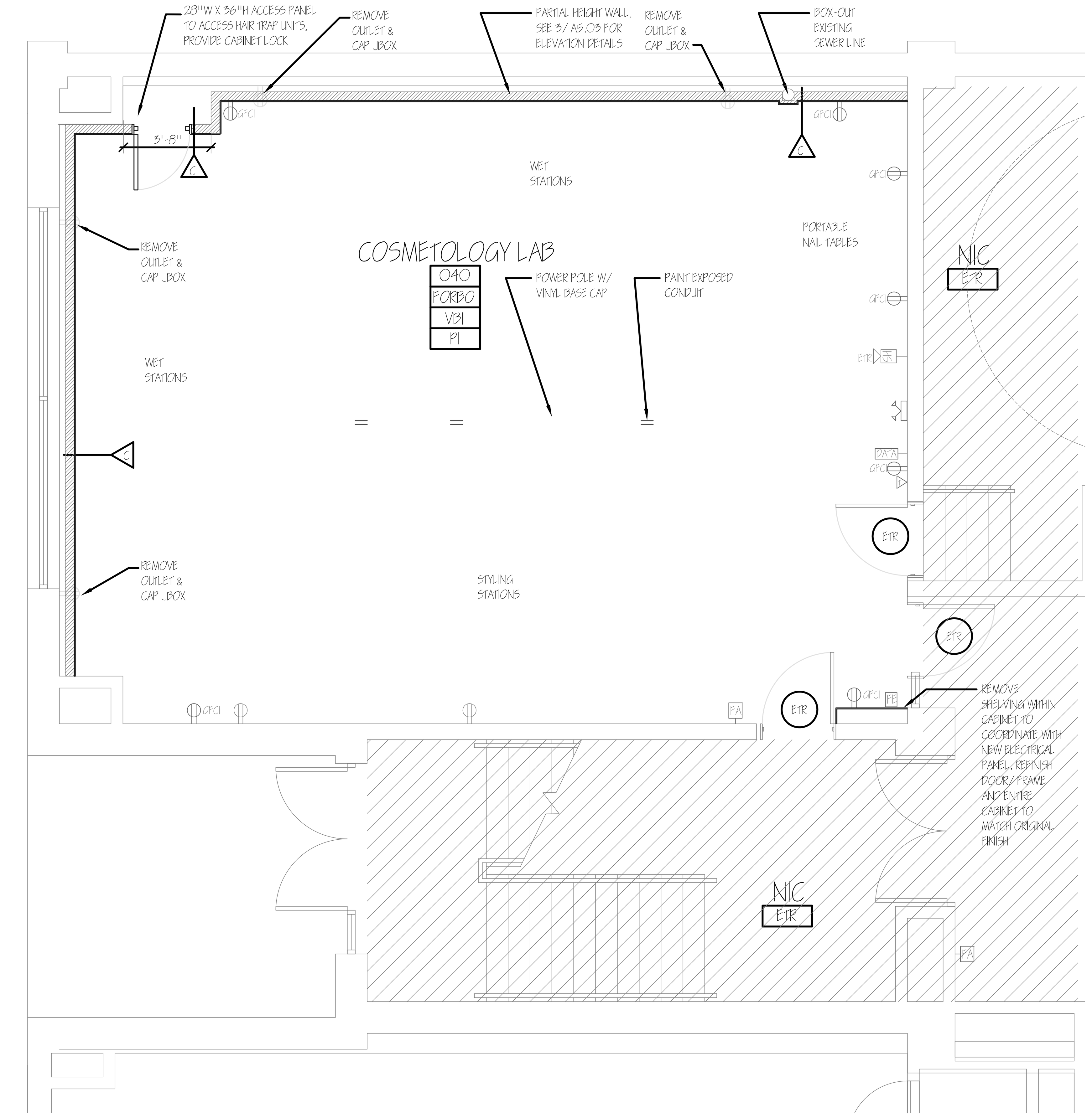
JOB#: 201205



3 HOOD SHROUD DIMENSION PLAN
1/2" = 1'-0"

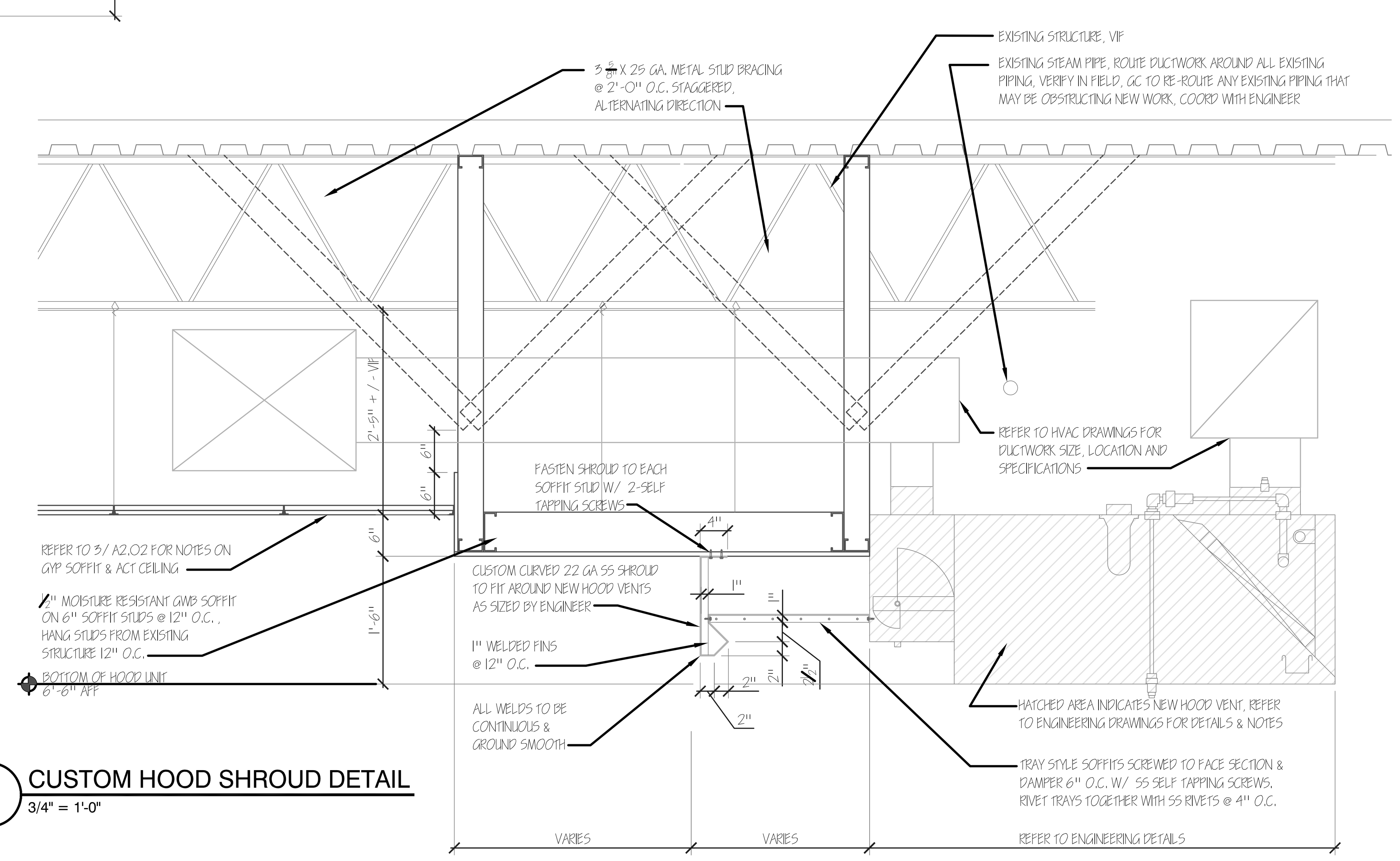


2 CONSTRUCTION PLAN - CHEF'S KITCHEN
1/4" = 1'-0"



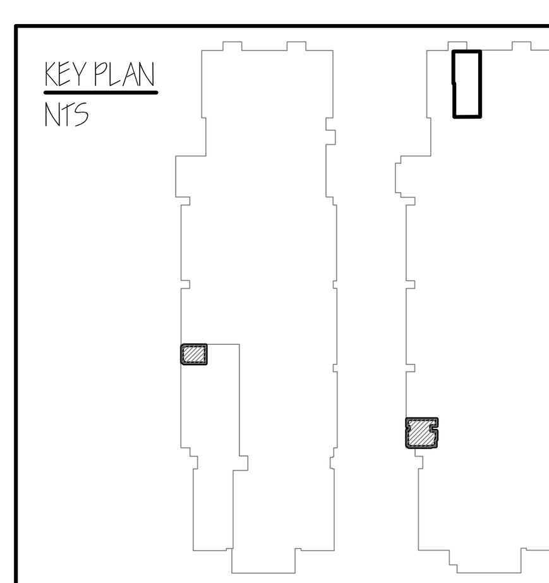
1 CONSTRUCTION PLAN - COSMETOLOGY
1/4" = 1'-0"

ROOM FINISH SCHEDULE							
NAME	NUMBER	FLOOR FINISH	BASE FINISH	WALL FINISH	CEILING FINISH	CEILING HEIGHT	NOTES
COSMETOLOGY LAB	101	FORBO FLOORING	VB1	EXISTING	ACT1*	EXISTING	CEILING GRID TO REMAIN, CLEAN AND PAINT
CHEF'S KITCHEN	110	FORBO FLOORING	VB1	EXISTING	ACT1/GWB	VARIES	



4 CUSTOM HOOD SHROUD DETAIL
3/4" = 1'-0"

KEY PLAN
NTS



JFF DESIGN
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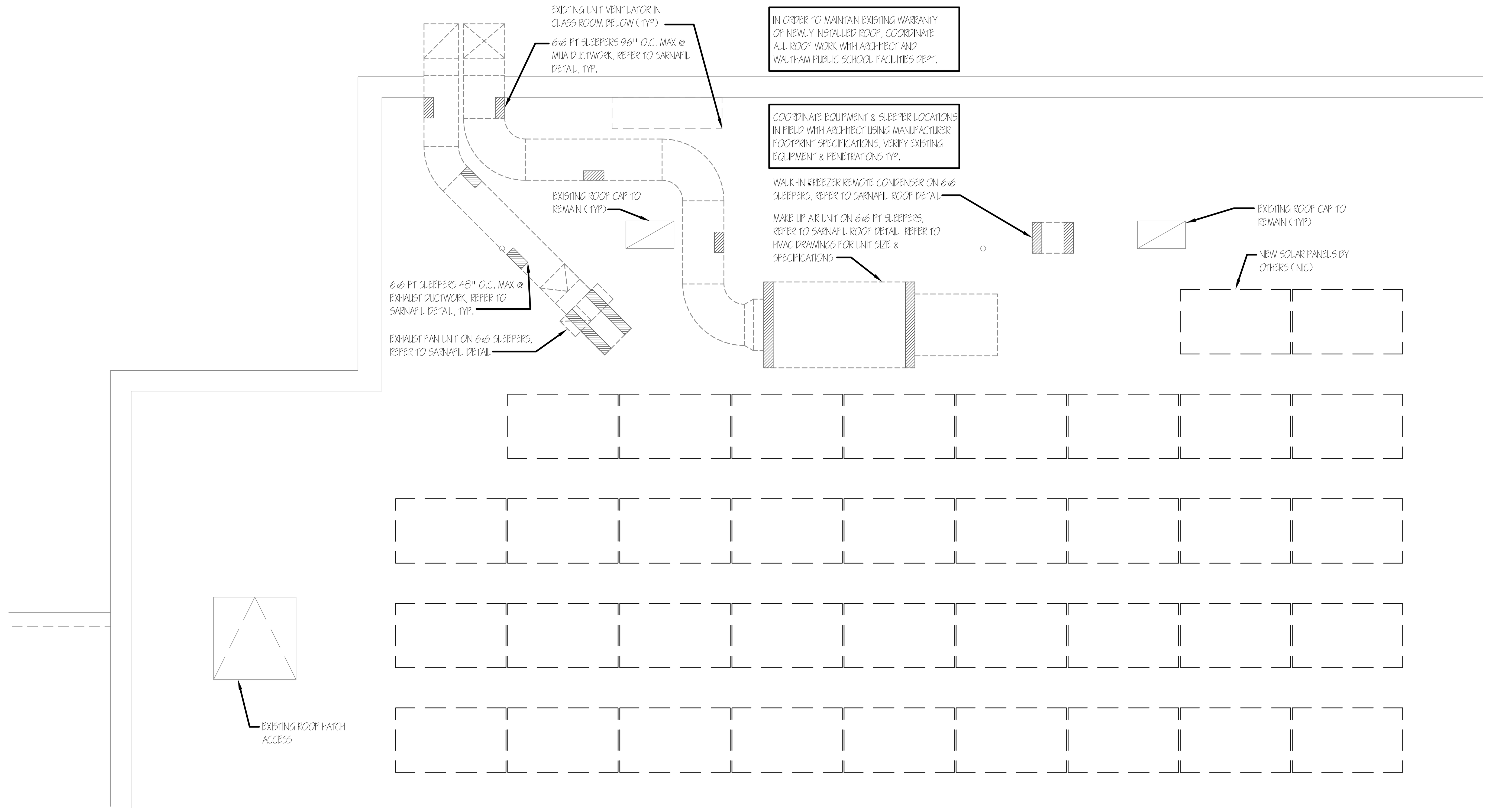
24 WARWICK AVENUE
WALTHAM, MA 02452

PROJECT: WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

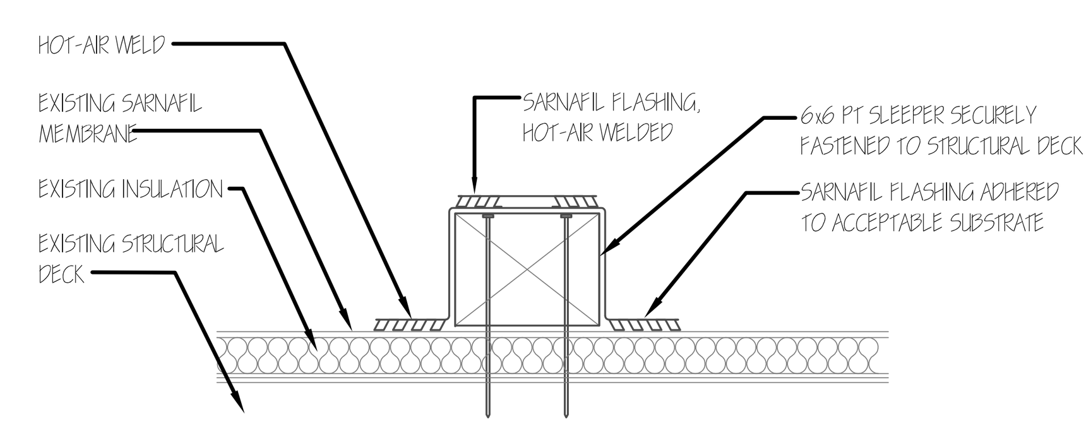
DRAWING TITLE: CONSTRUCTION PLAN - CHEF'S KITCHEN & COSMETOLOGY LAB

DRAWN BY: CSP/LSN
SCALE: AS NOTED
DATE: MAY 30, 2012
DRAWING NUMBER: A1.02
JOB #: 201205



1 PARTIAL ROOF PLAN - CHEF KITCHEN

1/4" = 1'-0"



NOTES:

1. WEIGHT OF UNIT TO BE EVENLY DISTRIBUTED OVER CROSS-SECTIONAL AREA OF EXPOSED WOOD NAILER

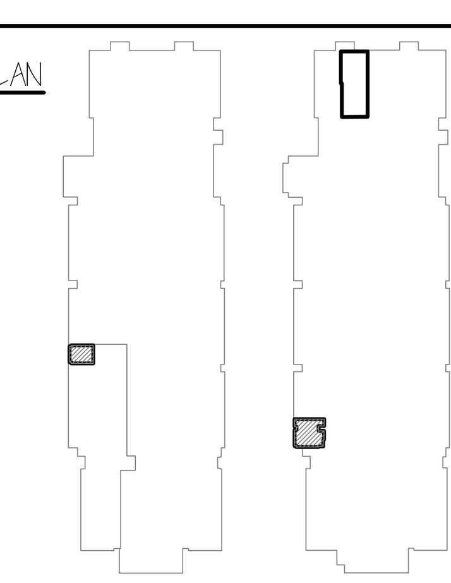
2. IF WEIGHT OF UNIT EXCEEDS MAXIMUM ALLOWED BY INSULATION MANUFACTURER, A TREATED WOOD NAILER BELOW THE SARNAFIL MEMBRANE IS REQUIRED.

2 SARNAFIL SLEEPER DETAIL

6" = 1'-0"

WORK DONE ON ROOF MUST BE DONE BY A CERTIFIED SARNAFIL ROOFING CONTRACTOR. COORDINATE DETAIL WITH ROOF MEMBRANE MANUFACTURER & INSULATION MANUFACTURER. PROVIDE MANUFACTURERS WITH UNIT WEIGHTS AND SLEEPER SPACING FOR THEIR CALCULATIONS. MEMBRANE MANUFACTURER'S REPRESENTATIVE TO INSPECT WORK DONE AND PROVIDE AN AMENDMENT TO THE ORIGINAL ROOF WARRANTY STATING THAT WORK HAS BEEN DONE PROPERLY TO SARNAFIL STANDARDS AND WARRANTY OF THE ORIGINAL ROOF IS ACTIVE.

KEY PLAN
NTS



REV#:	DESCRIPTION:
REV DATE:	

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24 WARWICK AVENUE
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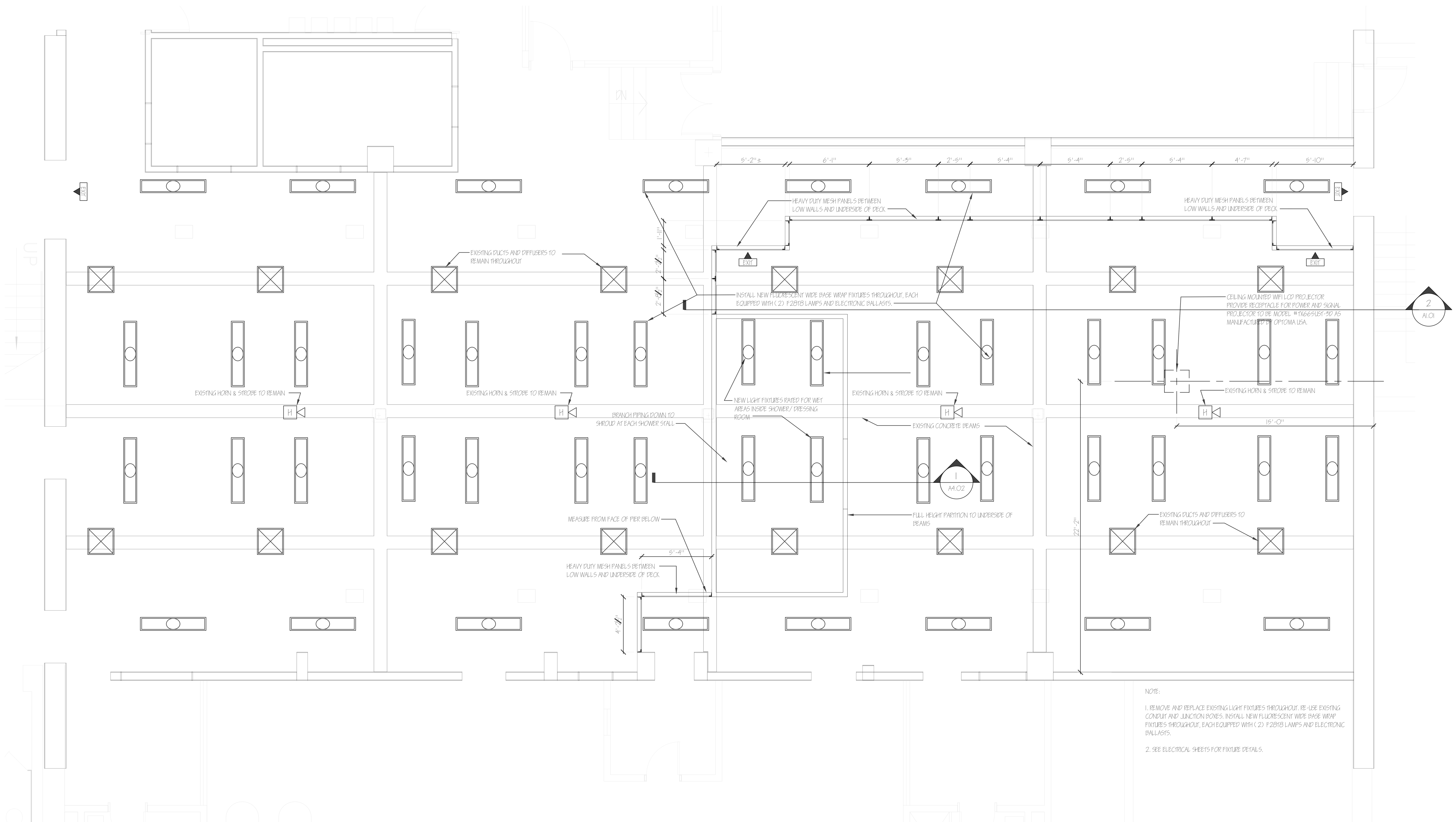
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE: PARTIAL ROOF PLAN - CHEF'S KITCHEN

DRAWING NUMBER: A1.03

JOB#: 201205



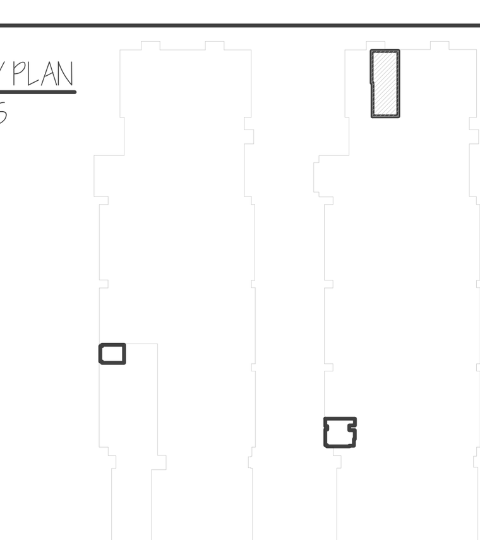
NOTE:

1. REMOVE AND REPLACE EXISTING LIGHT FIXTURES THROUGHOUT. RE-USE EXISTING CONDUIT AND JUNCTION BOXES. INSTALL NEW FLUORESCENT WIDE BASE WRAP FIXTURES THROUGHOUT, EACH EQUIPPED WITH (2) F28T8 LAMPS AND ELECTRONIC BALLASTS.

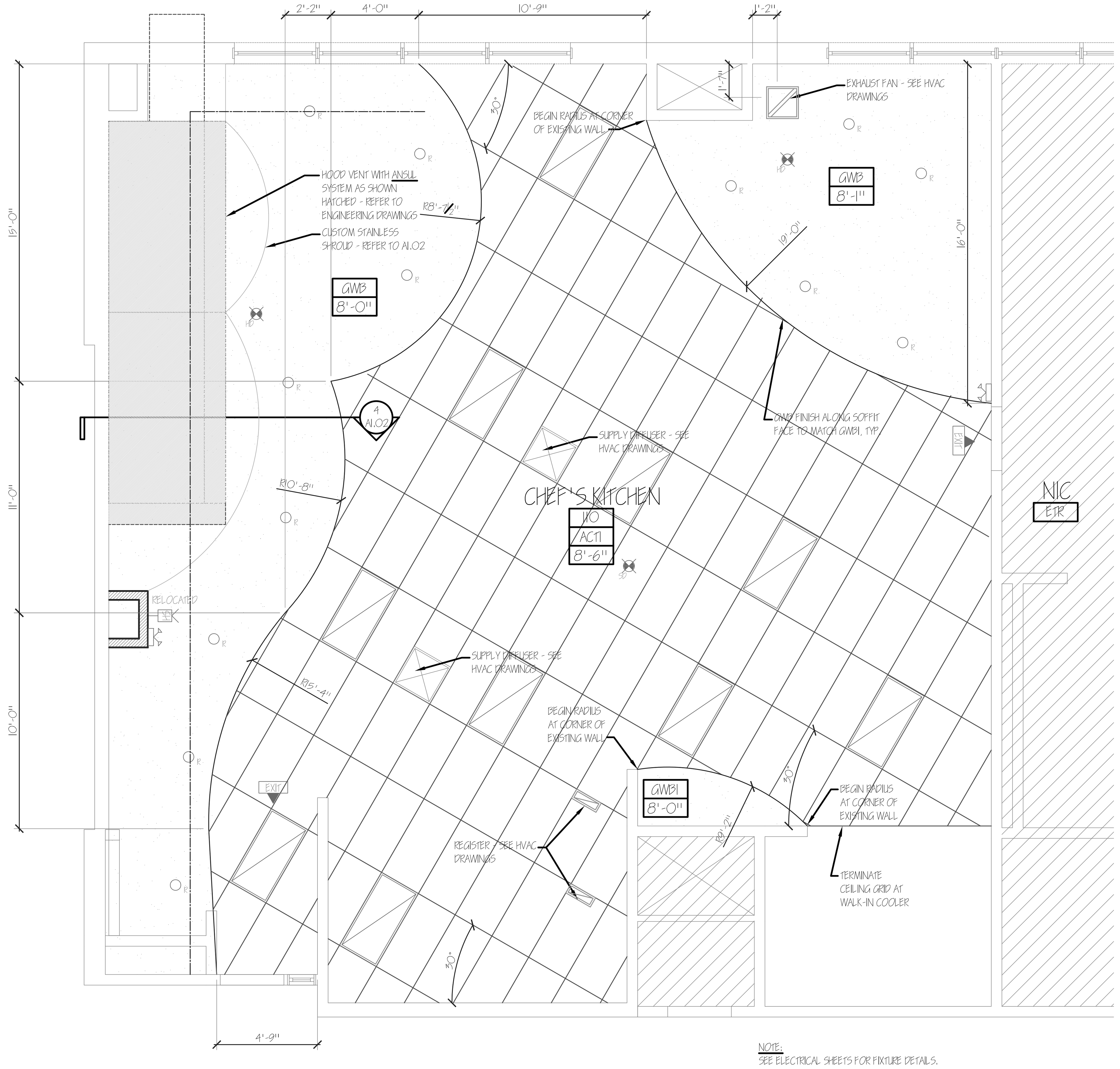
2. SEE ELECTRICAL SHEETS FOR FIXTURE DETAILS.

1 REFLECTED CEILING PLAN
1/4"=1'-0"

KEY PLAN
NTS

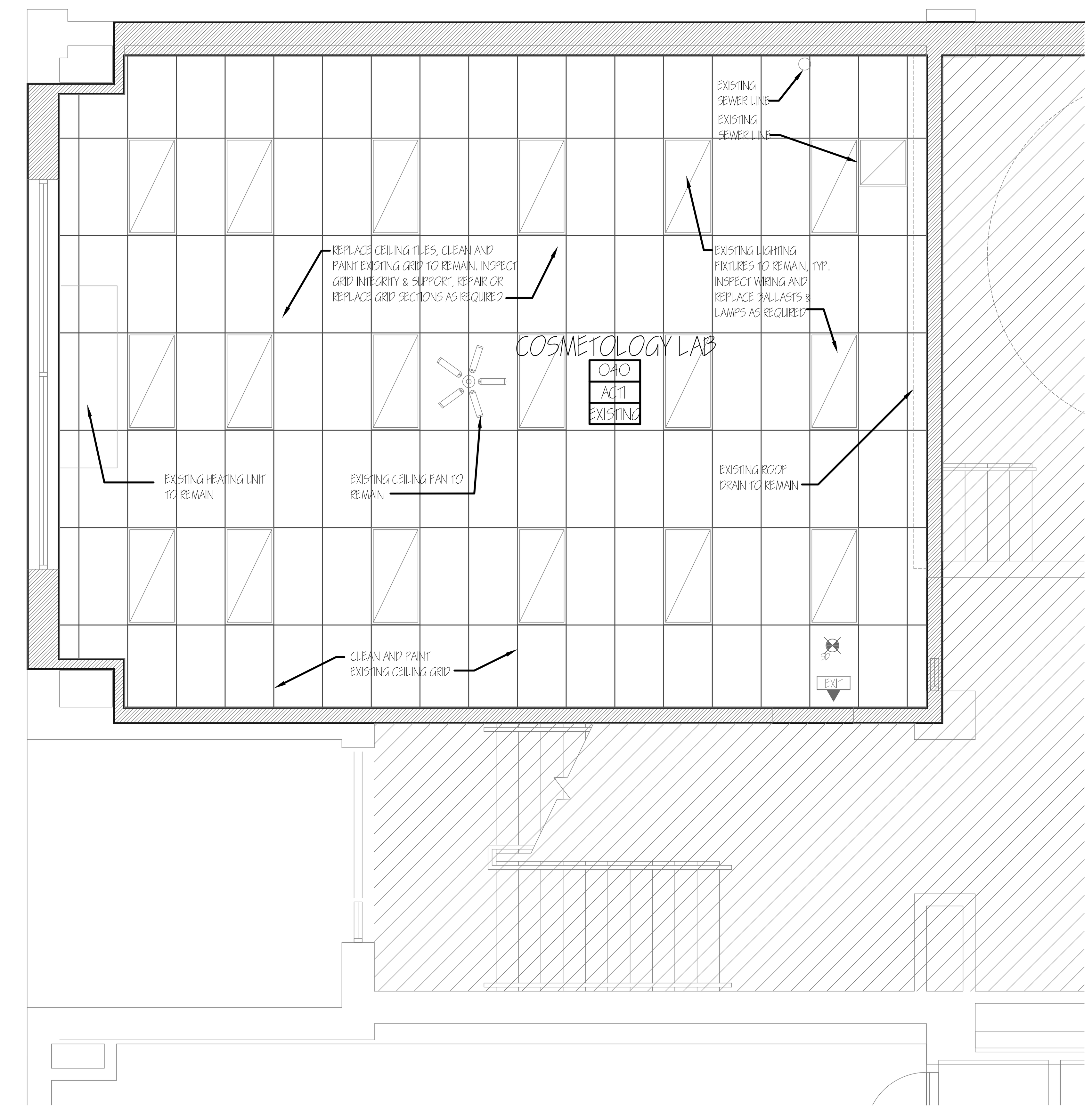


REV#: DESCRIPTION:	REV DATE:
JFF DESIGN ARCHITECTS & PLANNERS VC.781-899-6908 FAX 781-899-3050 EMAIL: ARCHITECTS@JFFDESIGN.COM 24 WARWICK AVENUE WALTHAM, MA 02452	DRN BY: CSP / LSN SCALE: AS NOTED DATE: MAY 30, 2012
PROJECT: WALTHAM HIGH SCHOOL CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM 617 LEXINGTON STREET WALTHAM, MA 02452	DRAWING NUMBER: A2.0
DRAWING TITLE: REFLECTED CEILING PLAN - TITLE IX LOCKER ROOM	
	JOB#: 201205



NOTE:
SEE ELECTRICAL SHEETS FOR FIXTURE DETAILS.

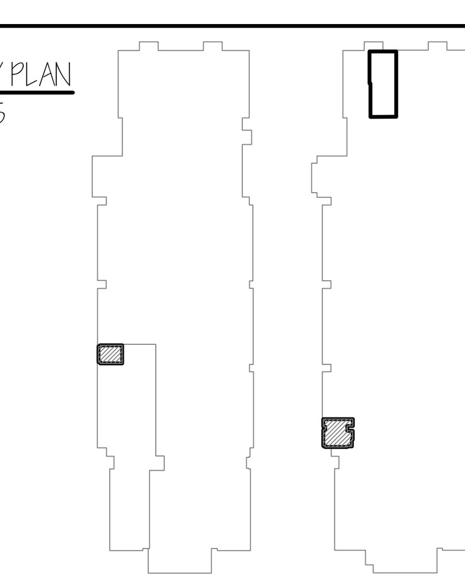
2 REFLECTED CEILING PLAN - CHEF'S KITCHEN
1/4" = 1'-0"



NOTE:
SEE ELECTRICAL SHEETS FOR FIXTURE DETAILS.

1 REFLECTED CEILING PLAN - COSMETOLOGY
1/4" = 1'-0"

KEY PLAN
NTS



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24 WARWICK AVENUE
WALTHAM, MA 02452

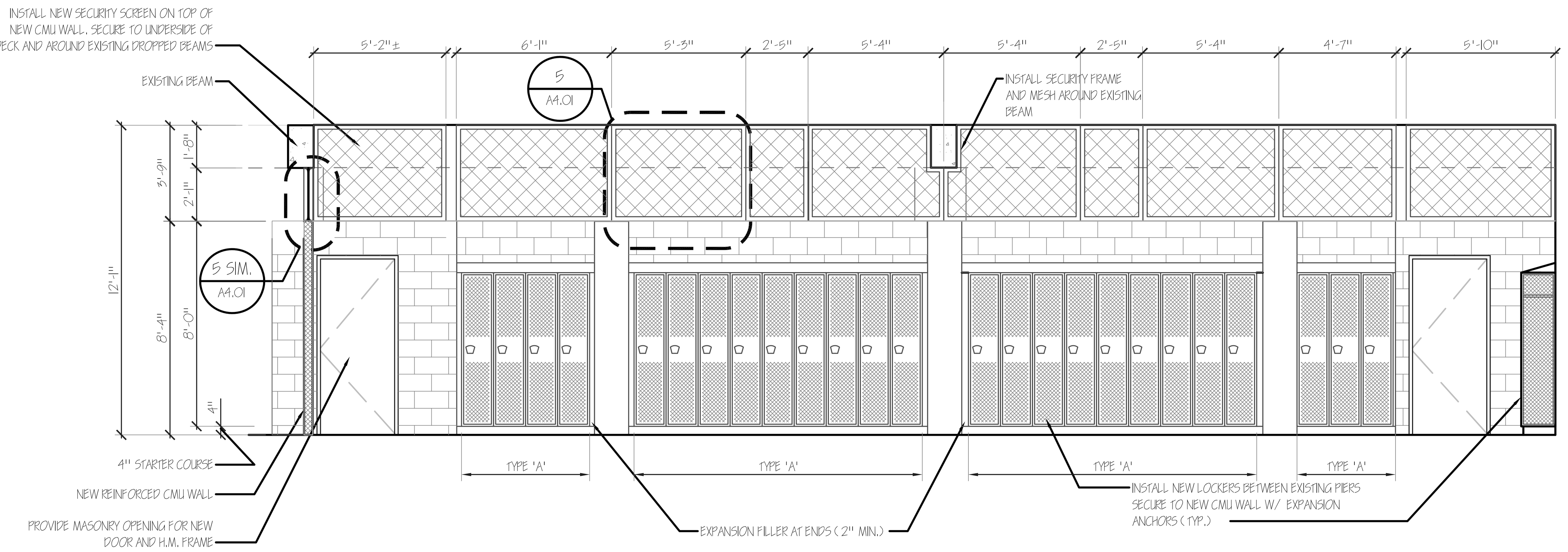
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

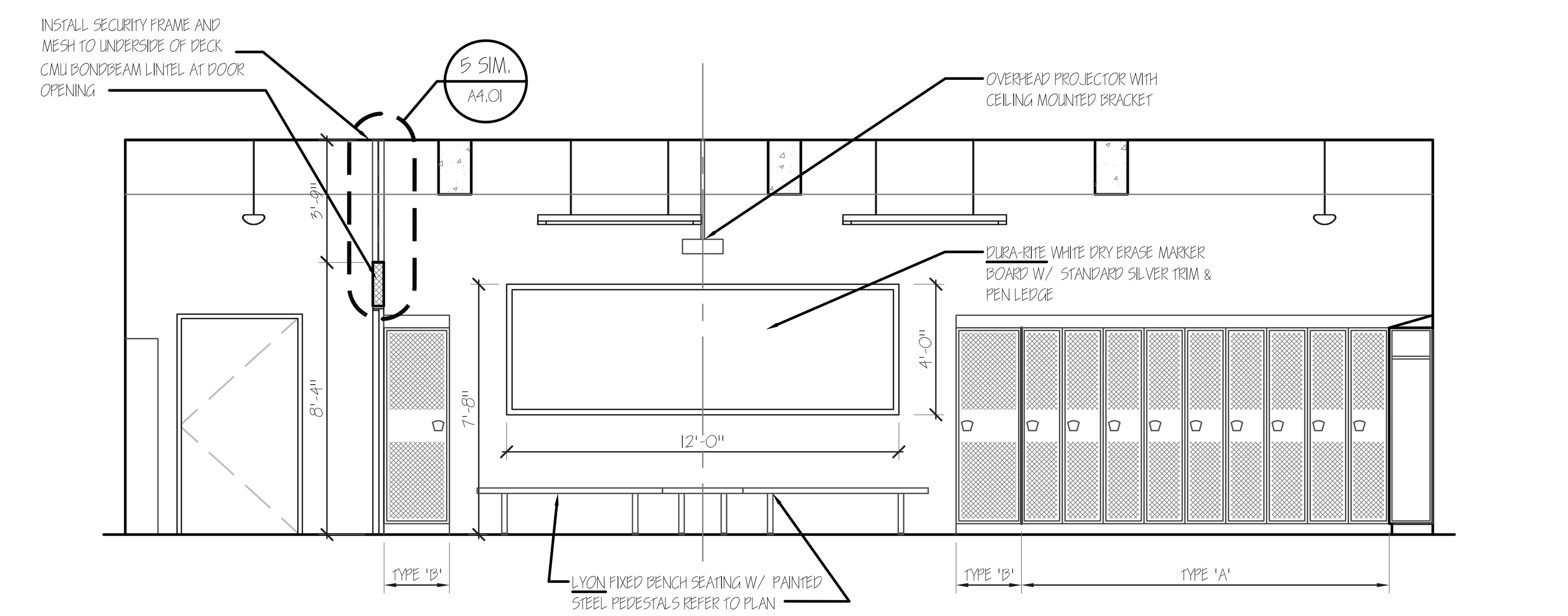
DRAWING NUMBER: A2.02

DRAWING TITLE: REFLECTED CEILING PLAN - CHEF'S KITCHEN & COSMETOLOGY LAB

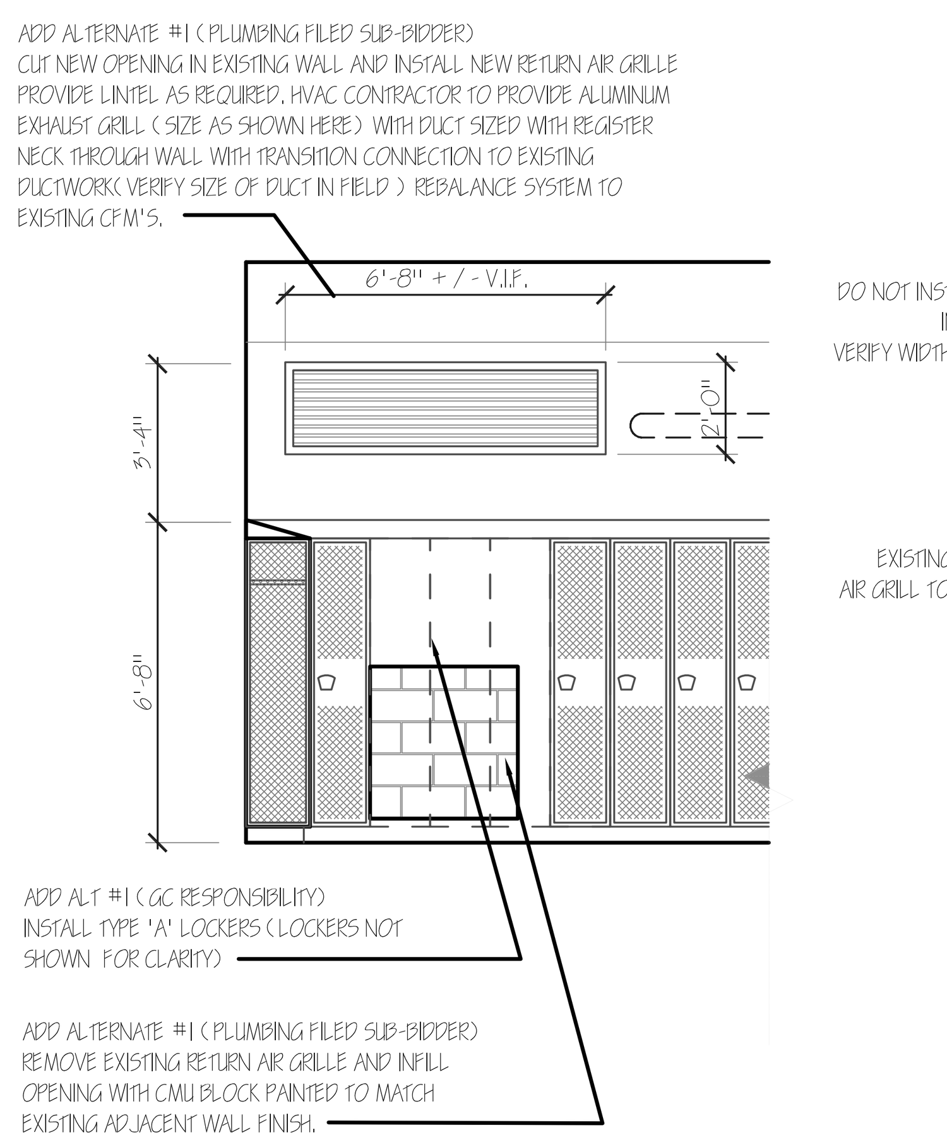
JOB#: 201205



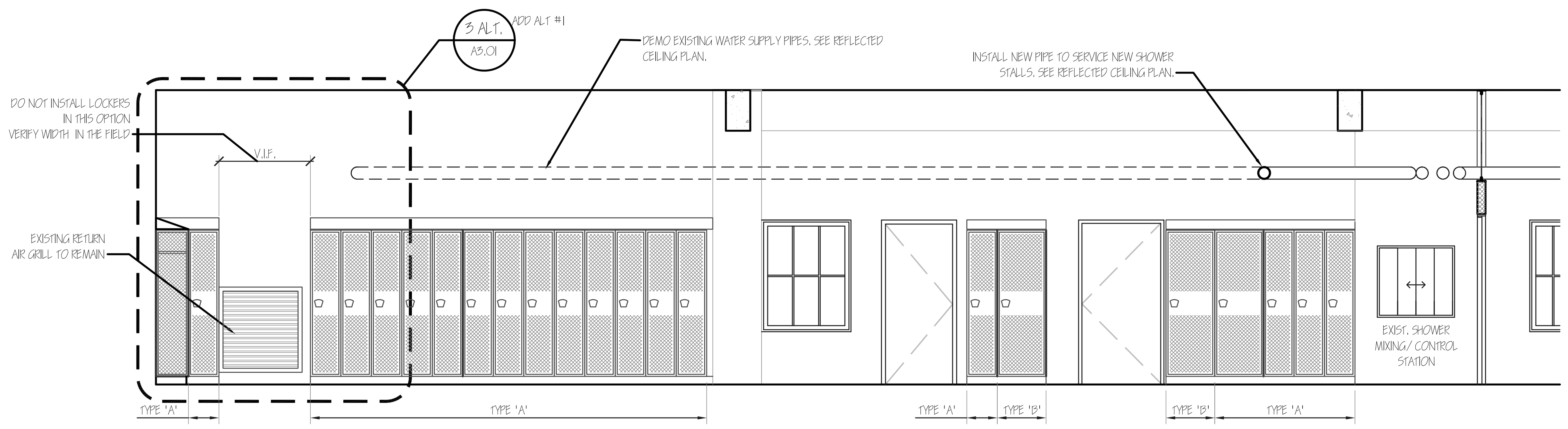
1 LOCKER ROOM ELEVATION
1/4"=1'-0"



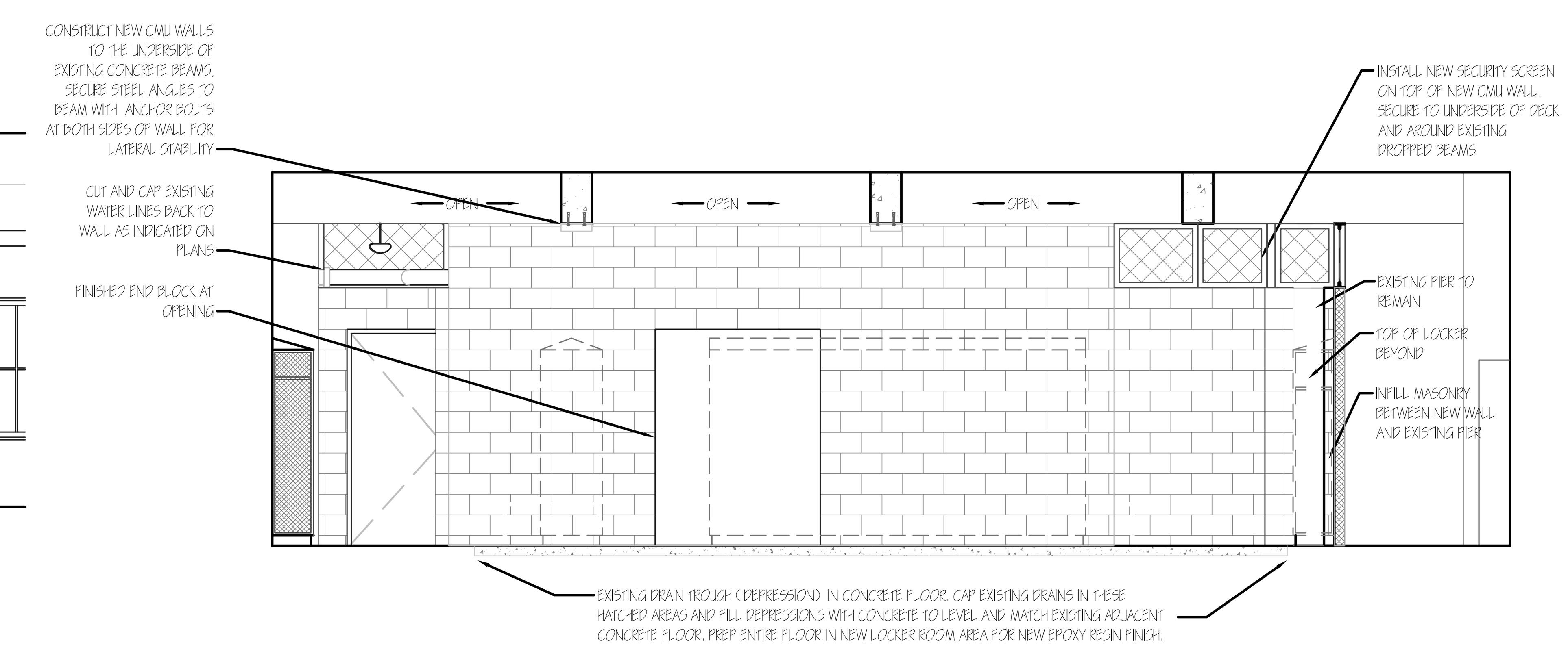
2 LOCKER ROOM ELEVATION
1/4"=1'-0"



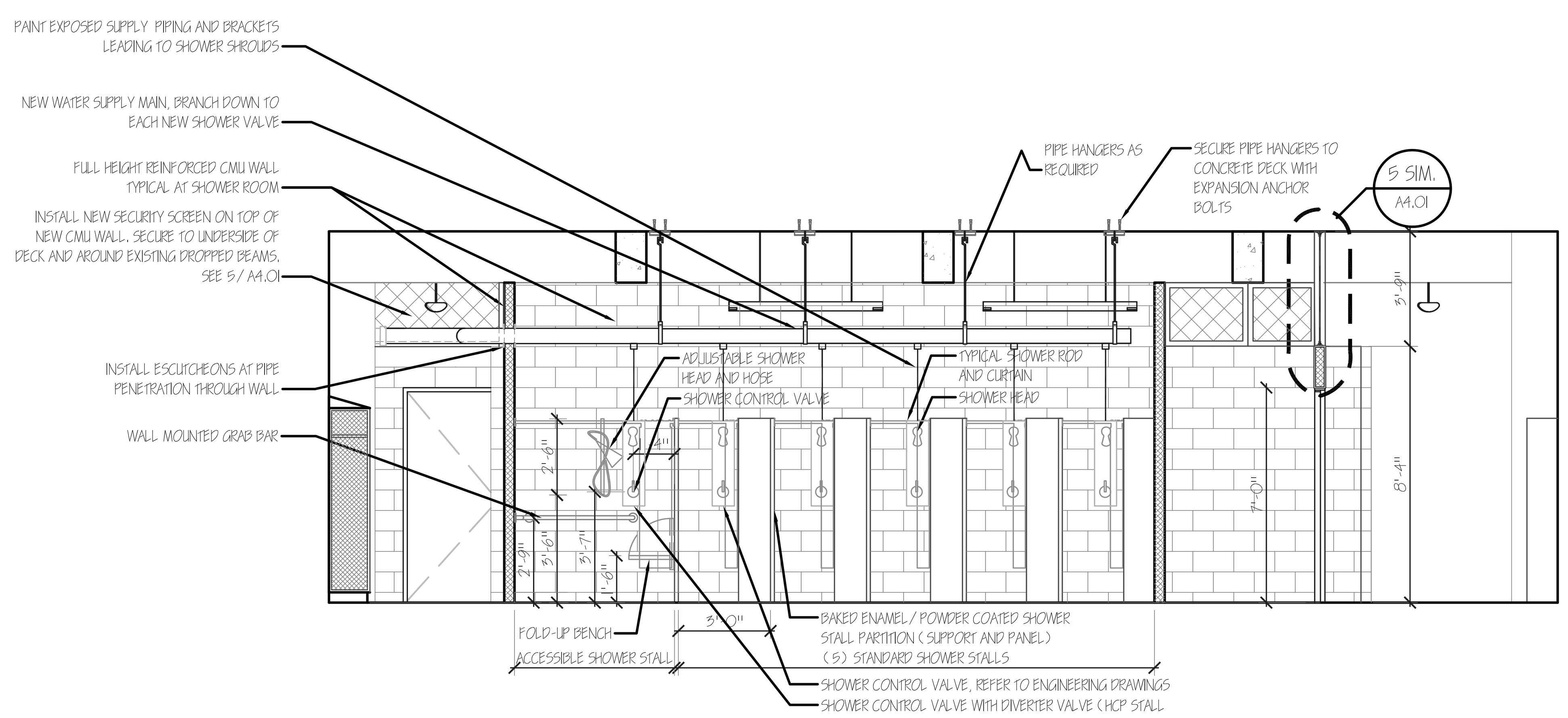
3 ALT. PARTIAL LOCKER ELEVATION - ADD ALTERNATE #1
1/4"=1'-0"



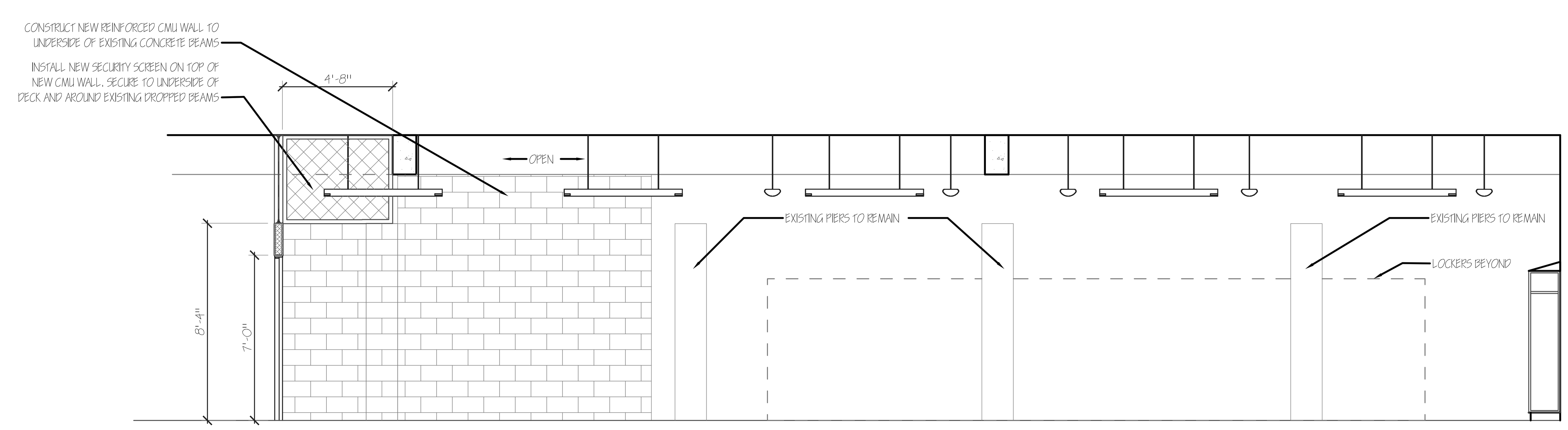
3 LOCKER ROOM ELEVATION
1/4"=1'-0"



4 LOCKER ROOM ELEVATION
1/4"=1'-0"



5 LOCKER ROOM ELEVATION
1/4"=1'-0"



6 LOCKER ROOM ELEVATION
1/4"=1'-0"

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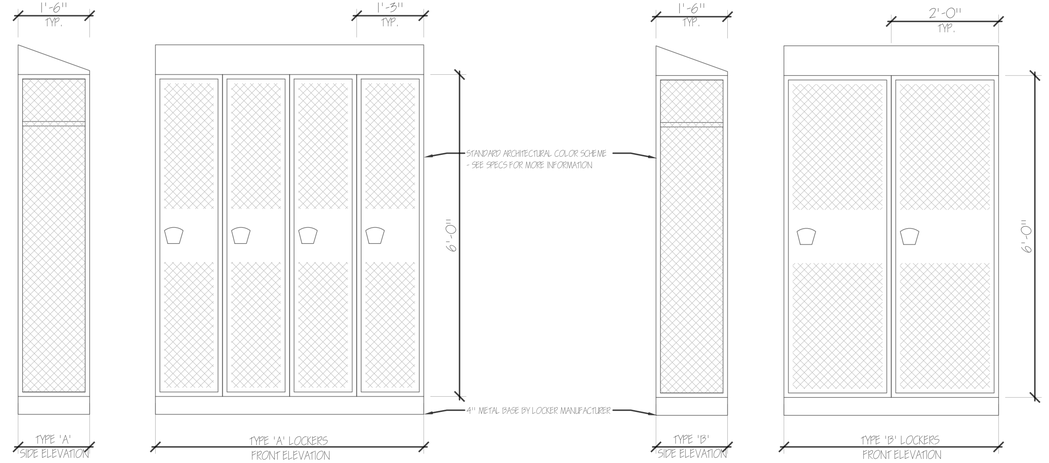
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

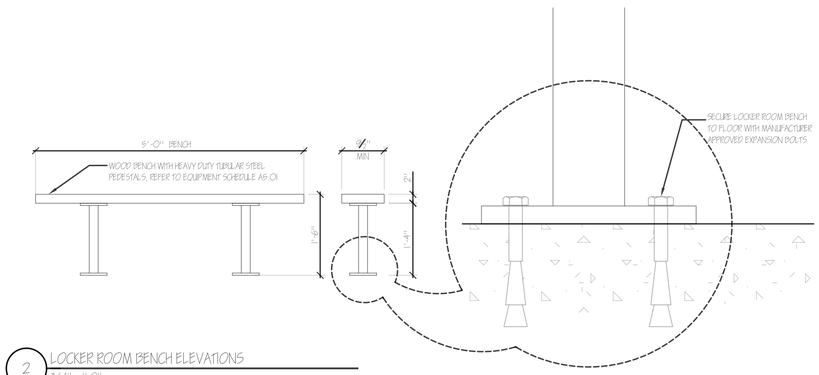
PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

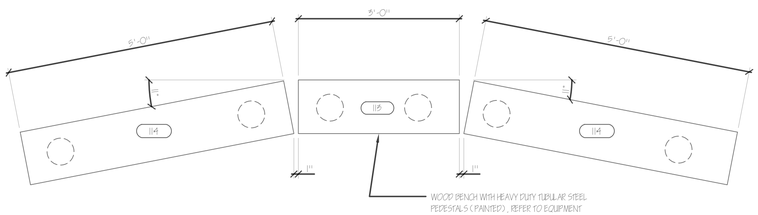
DRAWING TITLE: INTERIOR ELEVATIONS - TITLE IX LOCKER ROOM

DRAWING NUMBER: A3.01

JOB#: 201205







1 DOUBLE & SINGLE LOCKERS
3/4" = 1'-0"

2 LOCKER ROOM BENCH ELEVATIONS
3/4" = 1'-0"

3 TEAM MEETING BENCH LAYOUT
3/4" = 1'-0"

6 PLAN DETAIL AT EXISTING PIER
1 1/2"=1'-0"

C SECTION DETAIL AT SECURITY GRATE HEAD / CEILING
6"=1'-0"

5 TYPICAL SECURITY GRATE AT TOP OF WALL
3/4"=1'-0"

D SECTION DETAIL AT SECURITY GRATE SILL / TOP OF WALL
6"=1'-0"

NOTE: INSTALL NUT AND WASHERS AT SECURE SIDE, INSIDE GIRLS LOCKER ROOM AREA - TYPICAL

E OUTSIDE CORNER
6"=1'-0"

A PLAN DETAIL AT SECURITY GRATE
6"=1'-0"

F INSIDE CORNER
SCALE

B SECTION DETAIL AT SECURITY GRATE PIPE PENETRATION
3"=1'-0"

REV#:
DESCRIPTION:
REV DATE:

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WALTHAM, MA 02452

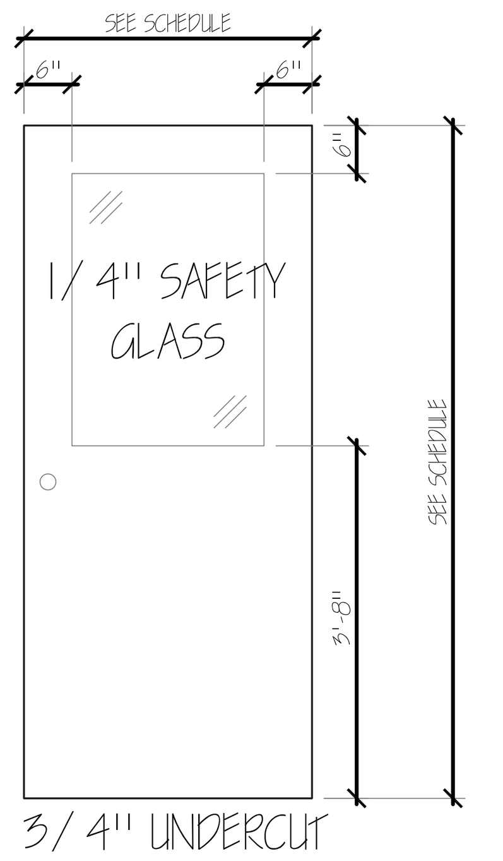
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

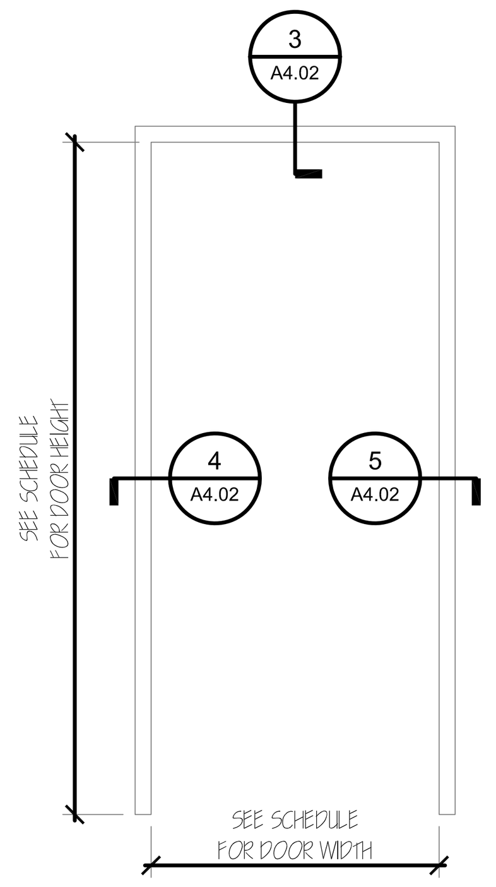
DRAWING NUMBER: A4.0

DRAWING TITLE: DETAILS - TITLE IX LOCKER ROOM

JOB#: 201205



DOOR TYPE A



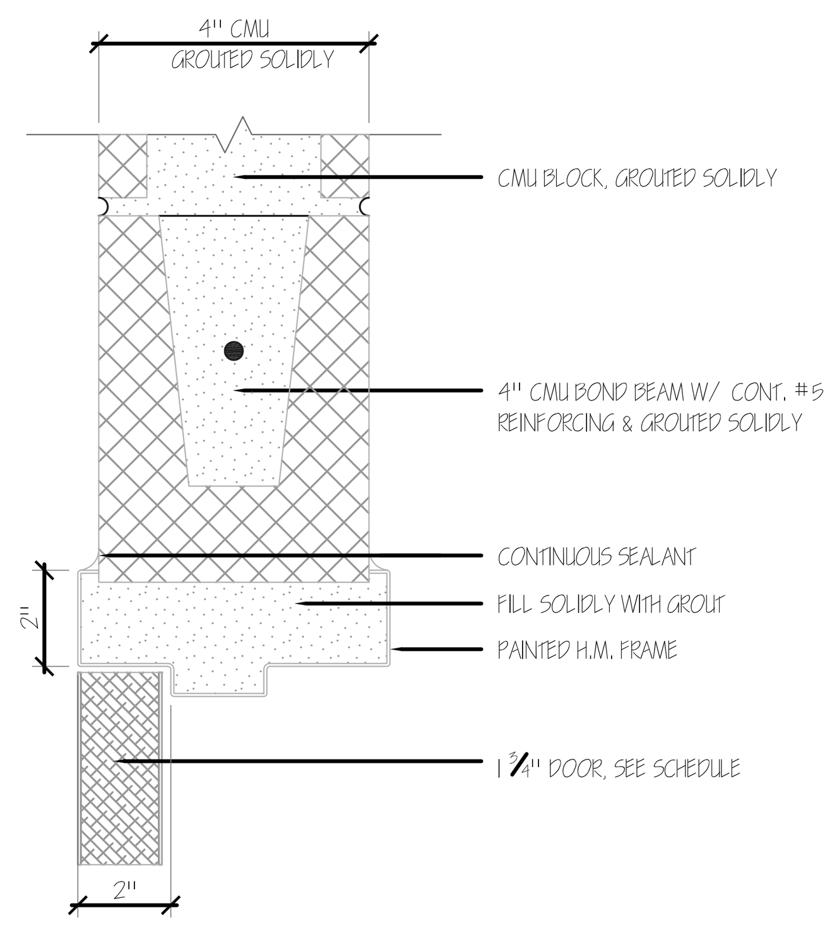
FRAME TYPE 1

DOOR AND FRAME SCHEDULE

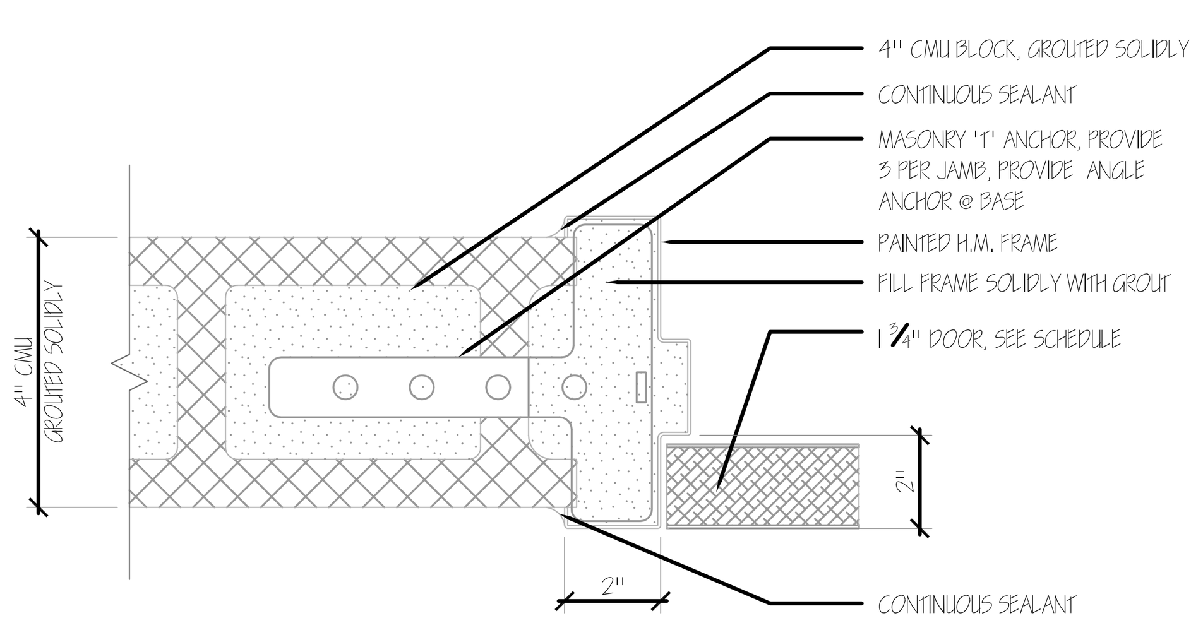
MARK	DOOR								FRAME					FIRE RATING LABEL	HARDWARE		NOTES
	EL	SIZE			MATL	GLAZING	LOUVER		MATL	EL	DETAIL				SET NO	KEYSIDE RM NO	
		WD	HGT	THK			WD	HGT			HEAD	JAMB	SILL				
01	A	3'-0"	6'-10"	2"	WOOD	1/4" SAFETY	0	0"	HM	1	3/A4.02	4/A4.02	3/4" UNDERCUT	--	1	112	--
02	A	3'-0"	6'-10"	2"	WOOD	1/4" SAFETY	0	0"	HM	1	3/A4.02	4/A4.02	3/4" UNDERCUT	--	1	112	--
03	A	3'-0"	6'-10"	2"	WOOD	1/4" SAFETY	0	0"	HM	1	3/A4.02	4/A4.02	3/4" UNDERCUT	--	1	112	--
04	N/A	5'-4"	7'-0"	--	--	--	--	--	--	-	--	--	--	--	1	--	OPENING

HARDWARE SET #1:
CLOSER
HANDSET

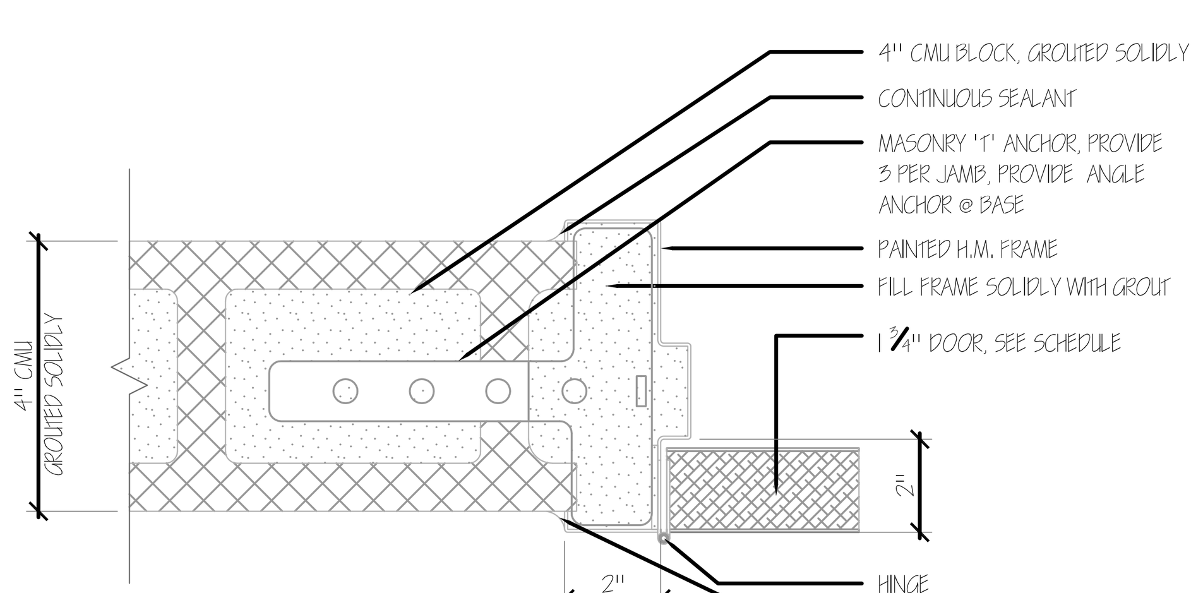
2 DOOR AND FRAME ELEVATIONS
1/2"=1'-0"



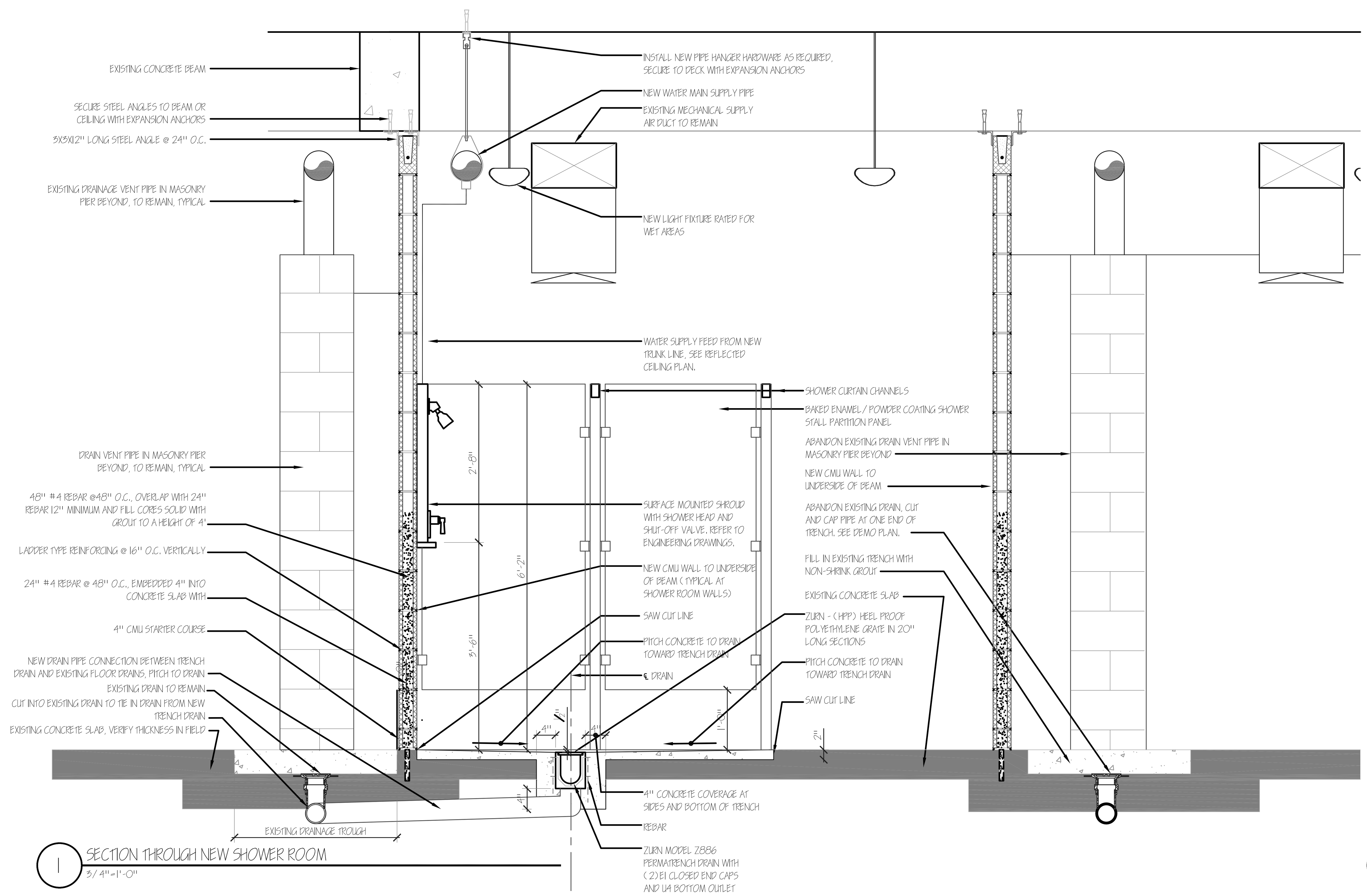
3 SECTION DETAIL AT DOOR HEAD
3"=1'-0"



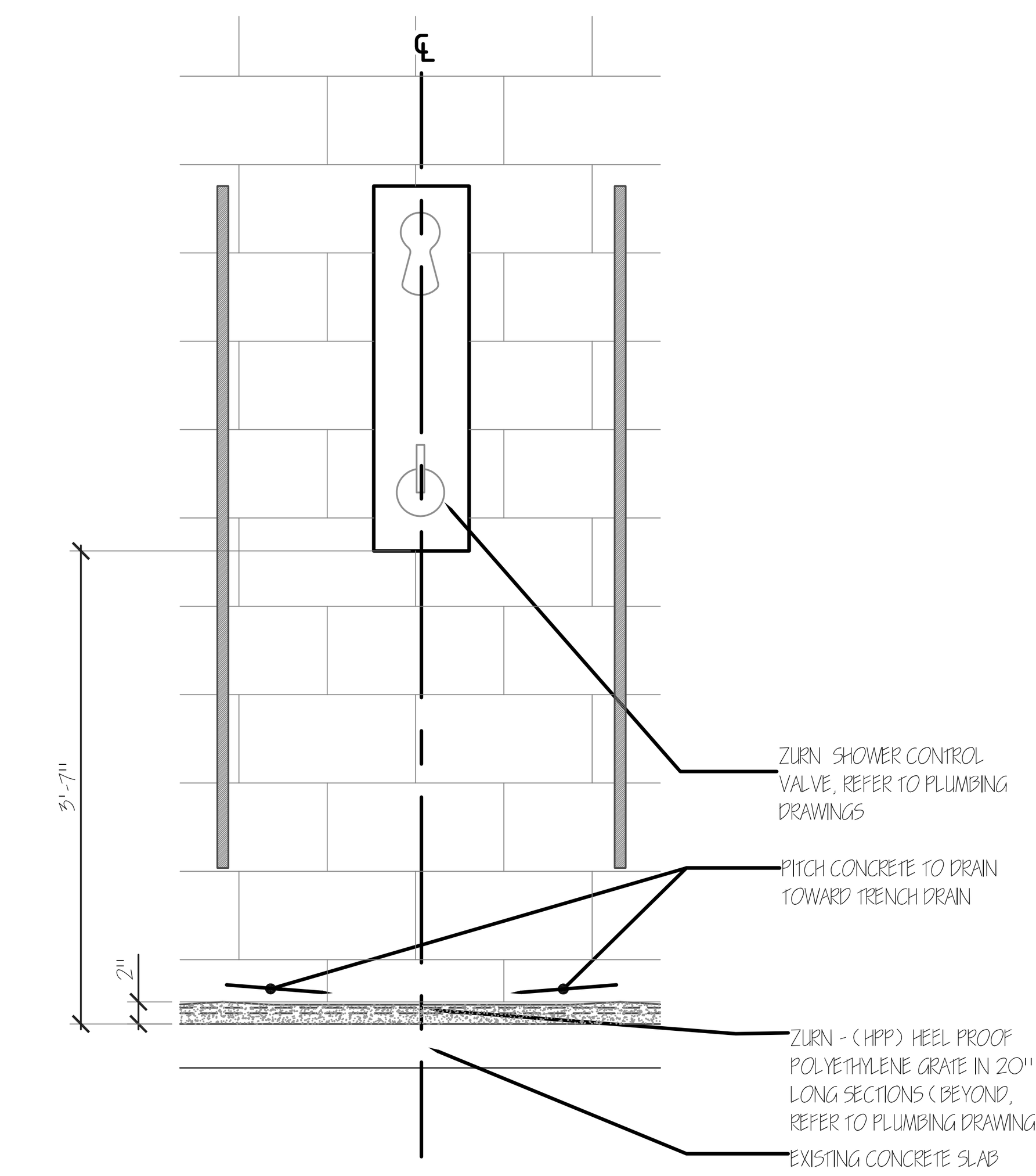
4 SECTION DETAIL AT DOOR JAMB STRIKE SIDE
3"=1'-0"



5 SECTION DETAIL AT DOOR JAMB HINGE SIDE
3"=1'-0"

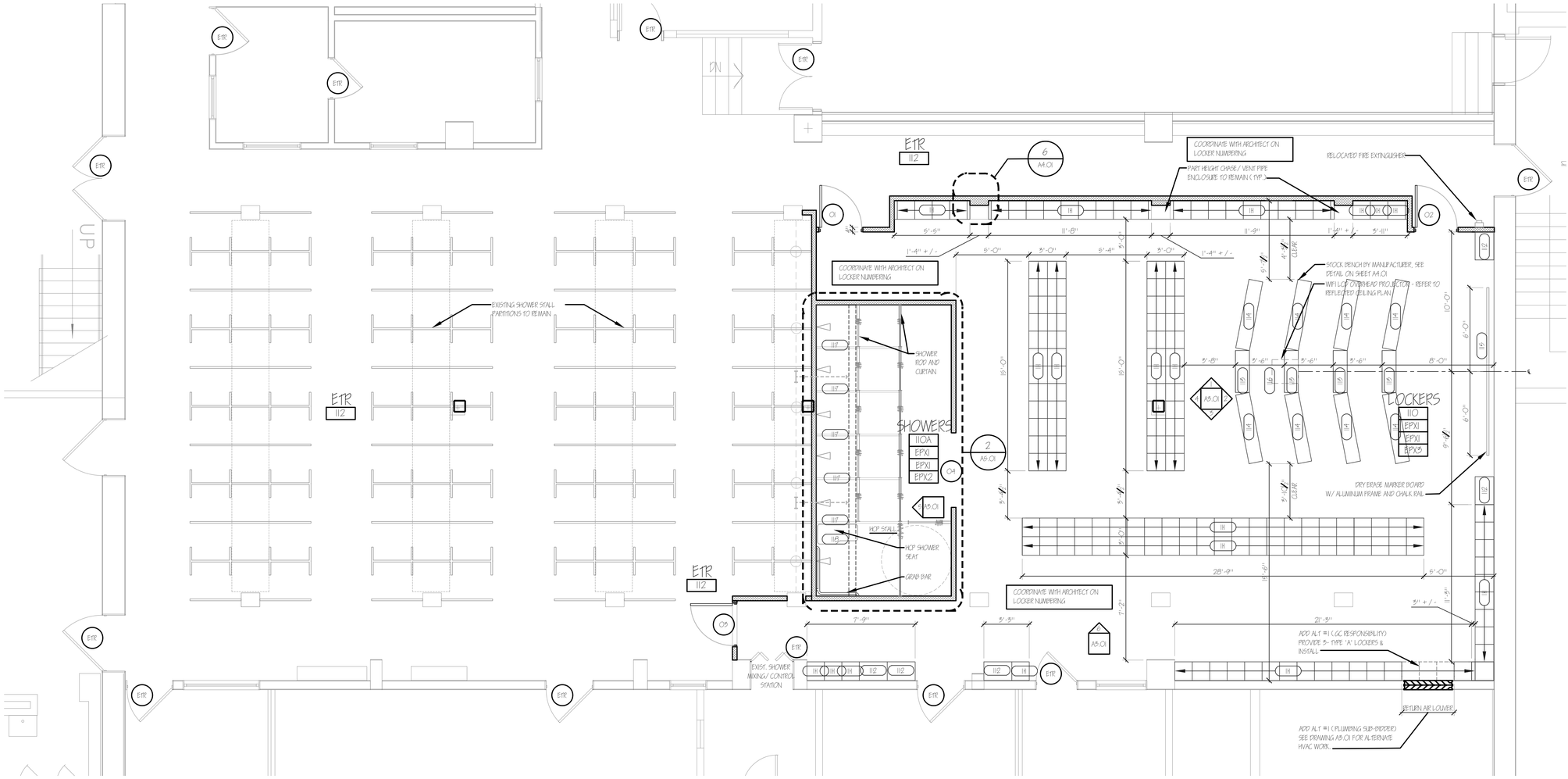


1 SECTION THROUGH NEW SHOWER ROOM
3/4"=1'-0"



6 SECTION THROUGH NEW SHOWER ROOM
3/4"=1'-0"

REV#:	DESCRIPTION:	REV DATE:
	JFF DESIGN ARCHITECTS & PLANNERS VC.781-899-6908 FAX 781-899-3050 EMAIL: ARCHITECTS@JFFDESIGN.COM 24 WARWICK AVENUE WALTHAM, MA 02452	DRN BY: CSP / LSN SCALE: AS NOTED DATE: MAY 30, 2012
PROJECT:	WALTHAM HIGH SCHOOL CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM 617 LEXINGTON STREET WALTHAM, MA 02452	DRAWING NUMBER: A4.02
DRAWING TITLE:	DETAILS - TITLE IX LOCKER ROOM	
		JOB#: 201205



1 EQUIPMENT PLAN
1/ 4"=1'-0"

2 ENLARGED EQUIPMENT PLAN - SHOWERS
1/ 2"=1'-0"

EQUIPMENT SCHEDULE

Item No	Equipment Category	Qty	Manufacturer	Model Number	ELECTRICAL	FINISH	POWER REQUIREMENTS	NOTES
111	LOCKER	144*	LYON	5052		STD. ARCHITECTURAL COLOR SCHEME	N/ A	BASE PANEL, NUMBER PLATE (* ADD ALT #1: 147 QTY)
112	HANDICAP LOCKER	5	LYON	5575		-	N/ A	BASE PANEL, NUMBER PLATE
113	BENCH	4	LYON	5793		-	N/ A	36" X 9-1/2" X 18"
114	BENCH	8	LYON	5795		-	N/ A	60" X 9-1/2" X 18"
115	DRY ERASE BOARD	1	DURA-RITE	–		-	N/ A	4'-0" H X 12'-0" W
116	PROJECTOR	1	–	–		-	JFF	
117	SHOWER PARTITIONS	5	–	–		POWDER COAT W/ BAKED ENAMEL	N/ A	2 CURTAINS
118	SHOWER SEAT	1	–	–		-	N/ A	ADA ACCESSIBLE STALL
119	LOCKER STOOL	149*	–	–		14" DIA, 1-1/4" MAPLE TOP, 3/4" ANGLE STEEL LEGS (STD. ARCHITECTURAL COLOR SCHEME)	N/ A	NOT SHOWN ON PLAN; ADJUSTABLE HEIGHT (* ADD ALT #1: 152 QTY)

KEY PLAN
NTS

JFF DESIGN
ARCHITECTS & PLANNERS
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24 WARWICK AVENUE
WALTHAM, MA 02452

REV #: | DESCRIPTION: | REV DATE:

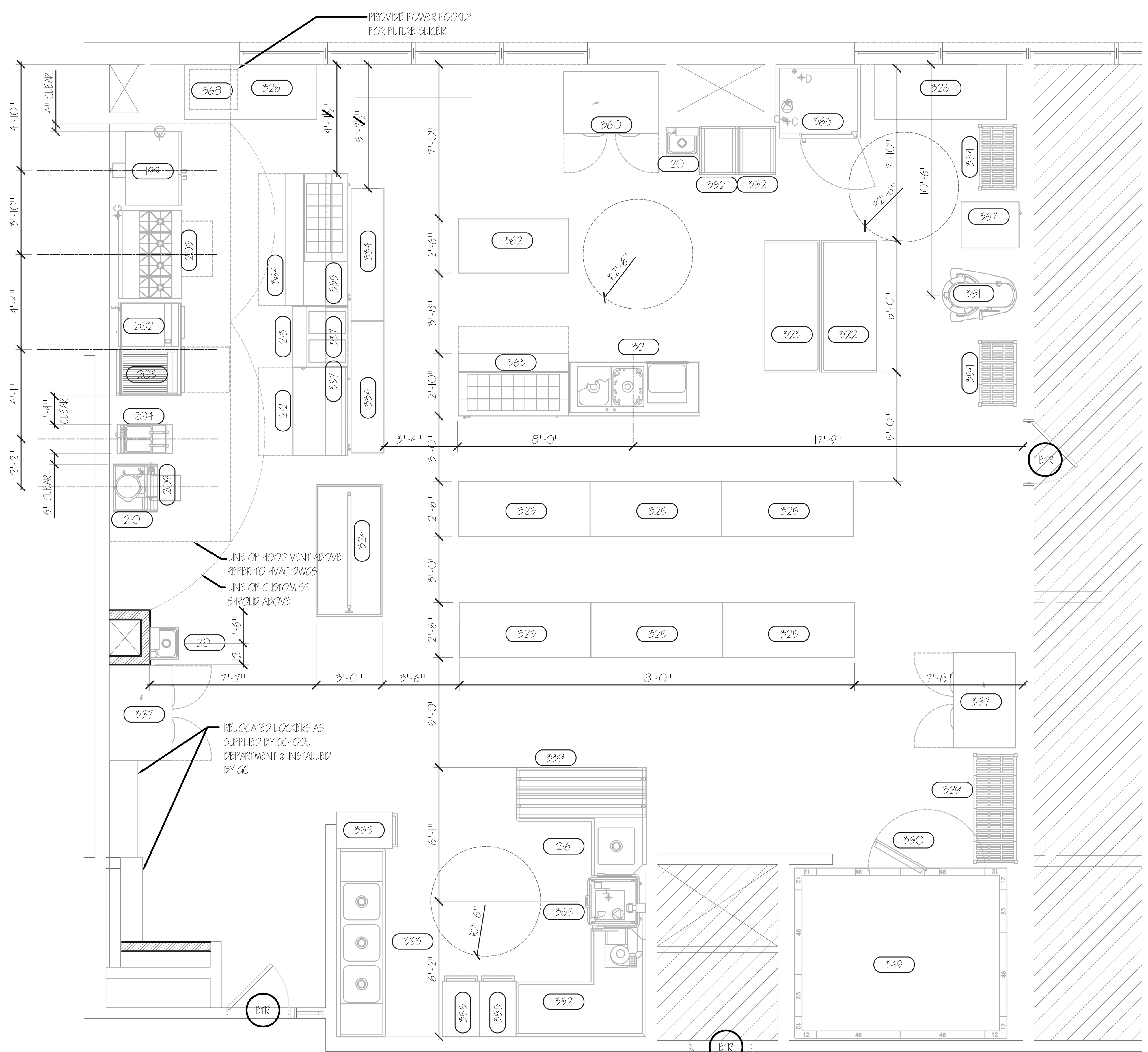
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02492

DRAWING NUMBER: A5.01

DRAWING TITLE:
EQUIPMENT PLAN - TITLE IX LOCKER ROOM

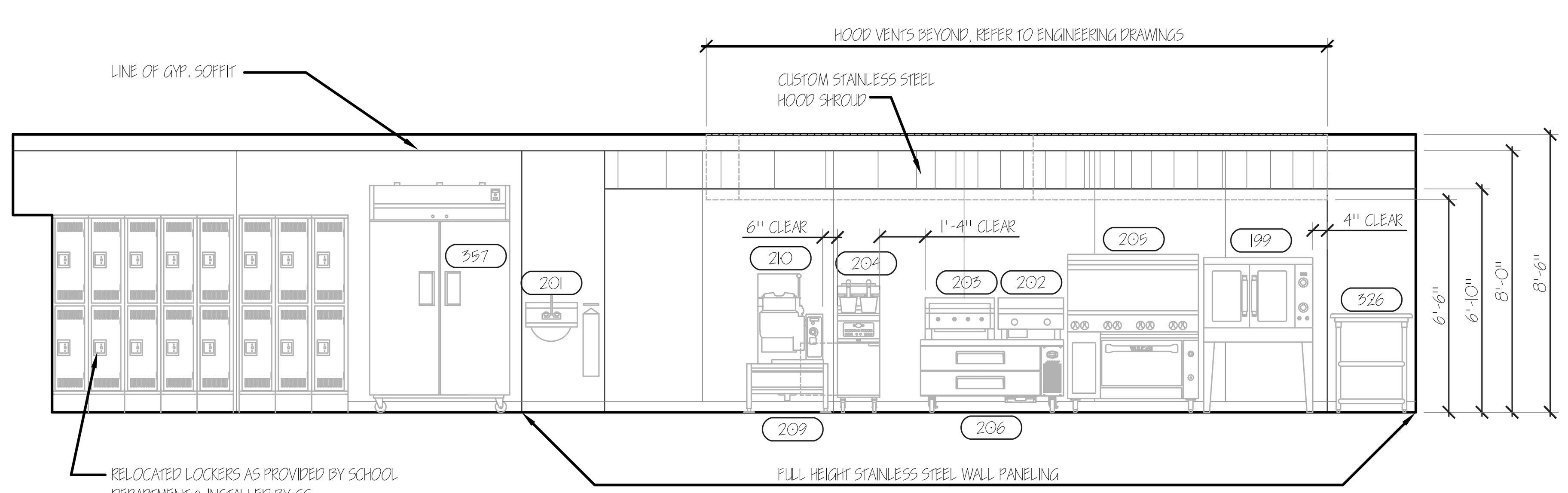
JOB #: 201209



1 EQUIPMENT PLAN - CHEF'S KITCHEN
1/4" = 1'-0"

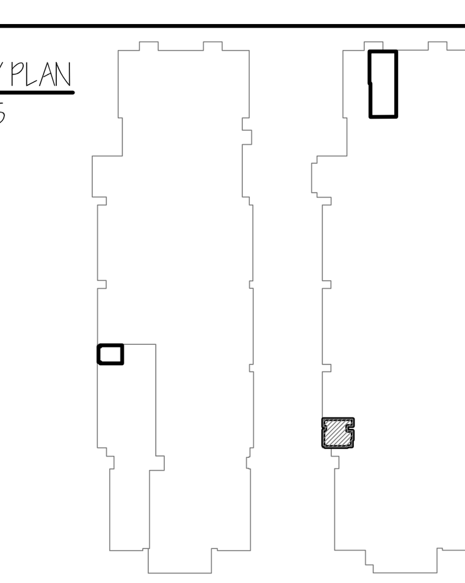
EQUIPMENT SCHEDULE

Item No	Equipment Category	Qty	Manufacturer	Model Number	Utility Connections Required: Plumbing	Electrical	Gas	Finish	Power Requirements	Notes
197	NOT USED									
199	Oven, Convection, Gas	1	Vulcan-Hart	VC4GD		●	●	STAINLESS STEEL	44,000 BTU 120/60/1 - 9A	
201	HAND SINK W/S-T	3	ADVANCE	7PS-79	●			STAINLESS STEEL	N/A	
202	Griddle, Gas	1	Vulcan-Hart	24RRG		●	●	STAINLESS STEEL	55,000 BTU 120/50-60/1 - 1A	
203	Broiler, Under-Fired, Gas, Counter	1	Vulcan-Hart	VACB25			●	STAINLESS STEEL	72,000 BTU	
204	Fryer, Deep Fat, Gas	1	Vulcan-Hart	1GR45AF		●	●	STAINLESS STEEL	120,000 115/50-60/1 - 5A	
205	Range, Restaurant, Gas	1	Vulcan-Hart	48S-8B-N		●	●	STAINLESS STEEL	275,000+66,000 BTU 115/60/1 - 4A	W/ SALAMANDER BROILER
206	Refrigerator, Shorty (griddle stand)	1	Turbo Air	TCBE-52SDR		●		STAINLESS STEEL	115/60/1 - 5.1A	
209	Kettle, Steam Jacketed, Counter, Elec, Tilt	1	Vulcan-Hart	K6ETT		●		STAINLESS STEEL	208/60-50/3 - 22A	
210	Stand, Kettle	1	Vulcan-Hart	VSKT30				STAINLESS STEEL	N/A	
212	Freezer, Undercounter, Compact	1	Turbo Air	TWF-48SD		●		STAINLESS STEEL	115/60/1 - 8.3A	
213	Table, Hot Food	1	Eagle Group/Metal Masters	SDHT2-208		●		STAINLESS STEEL	208/60/1 - 7.2A	
216	Dishtable, 'L' Shape, 16 gauge	1	Advance Tabco	DTS-G70-72L	●			STAINLESS STEEL	N/A	
321	Table, Prep w/ Sink	1	Advance Tabco	DL-30-72	●			STAINLESS STEEL	N/A	
322	Table, Wood Top	1	Advance Tabco	BG-306				SS/WOOD	N/A	
323	Table, Wood Top	1	Advance Tabco	BG-306				SS/WOOD	N/A	
324	Table, Overhead Mirror	1	Advance Tabco	VSS-DT-365				STAINLESS STEEL	N/A	
325	Table, Work, 18 gauge, Flat Top w/ Undershelf	4	Turbo Air	TSW-3072SS				STAINLESS STEEL	N/A	
326	Table, Work, 18 gauge, Flat Top w/ Undershelf	2	Turbo Air	TSW-3072SS				STAINLESS STEEL	N/A	
329	Shelving Unit, Starter, Plastic, Louvered	1	Cambro	ESU246064-580				STAINLESS STEEL	N/A	
332	Dishtable, 'L' Shape, 16 gauge	1	Advance Tabco	DTC-K60-72R	●			STAINLESS STEEL	N/A	
333	Sink, NSF, 3 comp, 18 gauge	1	Turbo Air	TSB-3-D2	●			STAINLESS STEEL	N/A	
334	Table, Enclosed Base, Dish Cabinet	2	Advance Tabco	DC-186				STAINLESS STEEL	N/A	
335	Overshelf, Table Mount	1	Advance Tabco	ODS-12-72				STAINLESS STEEL	N/A	
337	Overshelf, Table Mount	1	Advance Tabco	ODS-12-48				STAINLESS STEEL	N/A	
338	Overshelf, Table Mount	1	Advance Tabco	ODS-12-36				STAINLESS STEEL	N/A	
339	Dishtable, Sorting Shelf	1	Advance Tabco	DTA-79				STAINLESS STEEL	N/A	
349	Refrigerator, Walk-In Unit	1	American Panel Corporation	9'-8" x 7'-9"		●		WHITE POLY	100 MONITORING SYSTEM: 115V, 6A	
349A	CONDENSER 1.25HP	1	COPLAND	FJAM-A125-TFC-020	●	●			115/60/1 - 3.8A	
349B	COOLER	1	RUSSELL	AA28.106B-A		●			208/60/3 - 2.6A	
350	Door, Walk-In Cooler/Freezer	1	American Panel Corporation	STANDARD DOOR				SS HARDWARE	N/A	
351	EXISTING FLOOR MIXER	1	EXISTING	EXISTING		●		STAINLESS STEEL	UNKNOWN	
352	Rack, Bun Pan	2	Channel Manufacturing	401AKD				STAINLESS STEEL	N/A	
354	Shelving Unit, Starter, Plastic, Louvered	1	Cambro	CSU41366-480				STAINLESS STEEL	N/A	
355	Cart, Bussing	3	Cambro	BC230-110				STAINLESS STEEL	N/A	
357	Freezer, Reach-In	2	Turbo Air	M3F47-2		●		STAINLESS STEEL	115/60/1 - 10.5A	
360	Refrigerator, Reach-In	1	Turbo Air	M3R47-2		●		STAINLESS STEEL	115/60/1 - 9.2A	
362	Table, Work, 18 gauge, Back Splash w/ Undershelf	1	Turbo Air	TSW-3060SB				STAINLESS STEEL	N/A	
363	Refrigerator, SANDWICH UNIT	1	Turbo Air	MST-60-24		●		STAINLESS STEEL	115/60/1 - 8.9A	
364	SANDWICH UNIT	1	Turbo Air	MST-72		●		STAINLESS STEEL	115/60/1 - 9.9A	
365	VENTLESS DISHWASHER	1	Hobart	AM15VL-2				STAINLESS STEEL	208/60/3 - 45.4A	
366	DOUBLE DECK ELECTRIC CONVECTION OVEN	1	VULCAN	VC4E		●		STAINLESS STEEL	208/60/3 - 70A	
367	EXISTING PROOFING BOX	1	EXISTING	EXISTING		●		EXISTING	UNKNOWN	
368	FUTURE MANUAL DELI SLICER	1	GLOBE (OR SIMILAR)	3600P		●		STAINLESS STEEL	115/60/1 - 7A	



2 INTERIOR ELEVATION - CHEF'S KITCHEN
1/4" = 1'-0"

KEY PLAN
NTS



REV #:	DESCRIPTION:
REV DATE:	

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24 WARWICK AVENUE
WALTHAM, MA 02452

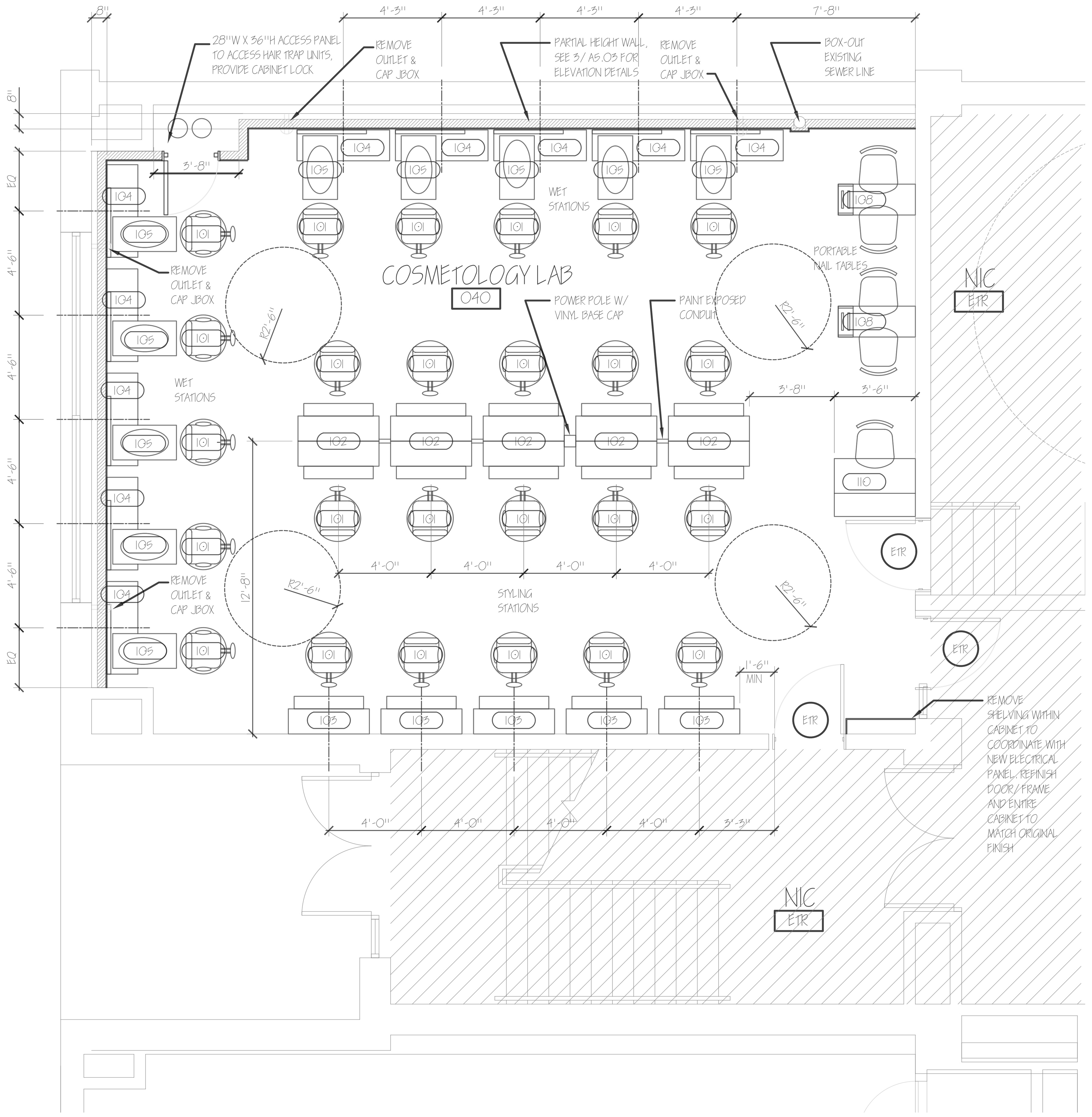
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE: EQUIPMENT PLAN - CHEF'S KITCHEN

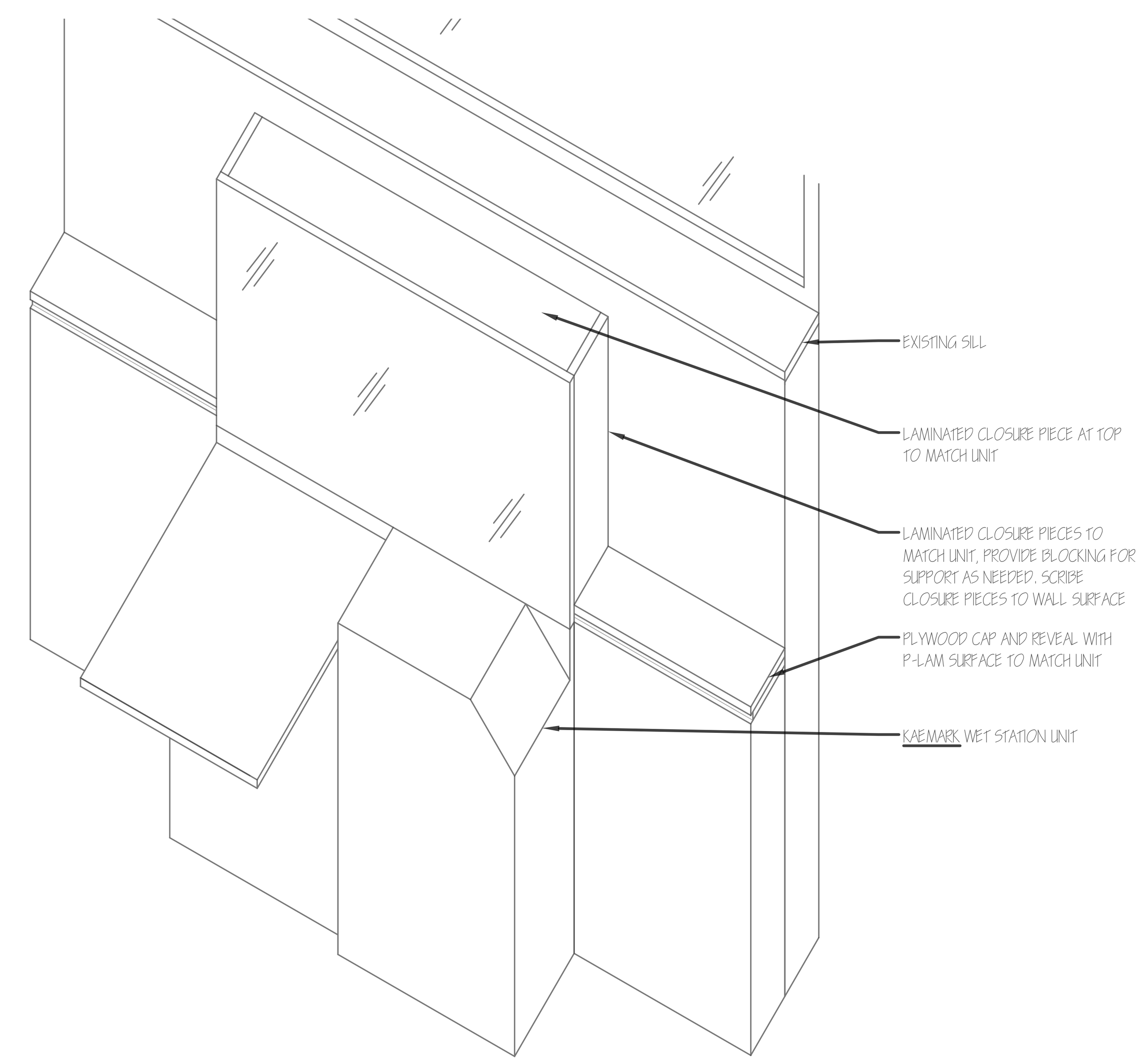
DRAWING NUMBER: A5.02

JOB #: 201205

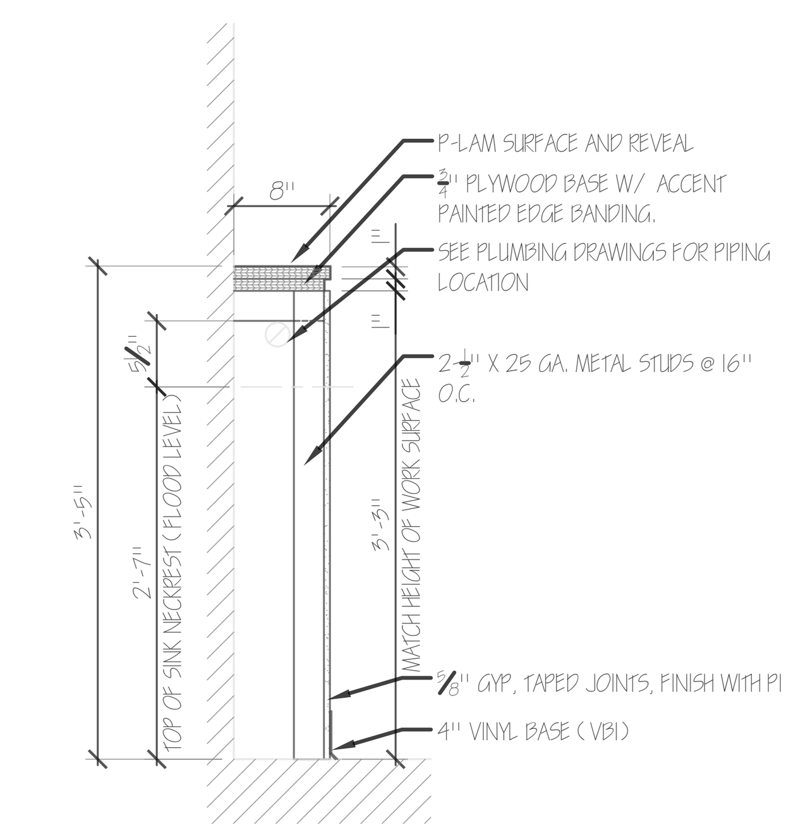


1 CONSTRUCTION PLAN - COSMETOLOGY
1/4" = 1'-0"

EQUIPMENT SCHEDULE										
Item No	Equipment Category	Qty	Manufacturer	Model Number	UTILITY CONNECTIONS REQUIRED: PLUMBING	ELECTRICAL	N/A	FINISH	POWER REQUIREMENTS	NOTES
101	STYLING CHAIR	25	KAEMARK	W-64HR				BLACK	N/A	W/ HEADREST, MANNEQUIN SIMULATOR, HK10-AS BASE, & 260 FOOTREST
102	STYLE STATION (DOUBLE)	5	KAEMARK	105-2		●		4623-60 W/ 4779-60 TOP	120V 20A GFI (x2)	DEDICATED 20A CIRCUIT EACH STATION
103	STYLE STATION (SINGLE)	5	KAEMARK	105-1		●		4623-60 W/ 4779-60 TOP	120V 20A GFI	DEDICATED 20A CIRCUIT EACH STATION
104	WET STATION	10	KAEMARK	SC-448		●		4623-60 W/ 4779-60 TOP	120V 20A GFI	DEDICATED 20A CIRCUIT EACH STATION; 68" O.A. UNIT HEIGHT
105	SHAMPOO BOWL	10	BELVEDERE	PS-3100-BL	●			BLACK	N/A	W/ 403C VACUUM BREAKER
106	HOOD DRYER	10	BELVEDERE	B900S		●		BLACK	120V 10A	W/ 17009B DRYER CART
107	FACIAL STEAMER	1	S&A	1000B		●		WHITE	120V 5.8A	NOT SHOWN ON PLAN
108	NAIL TABLE	10	KAYLINE	401		●		WHITE	120V	NOT ALL UNITS SHOWN ON PLAN
109	FATIGUE MAT	25	UNIQUE MAT	35250NT				BLACK	N/A	NOT SHOWN ON PLAN
110	DESK	1	KAEMARK	J-40-4				4779-60 W/ 4623-60 TRIM	N/A	

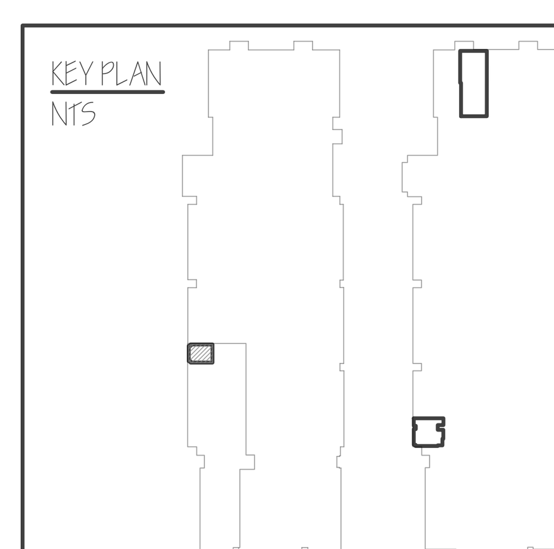


2 AXONOMETRIC VIEW
3/4" = 1'-0"



3 WALL DETAIL - TYPE C
3/4" = 1'-0"

KEY PLAN
NTS



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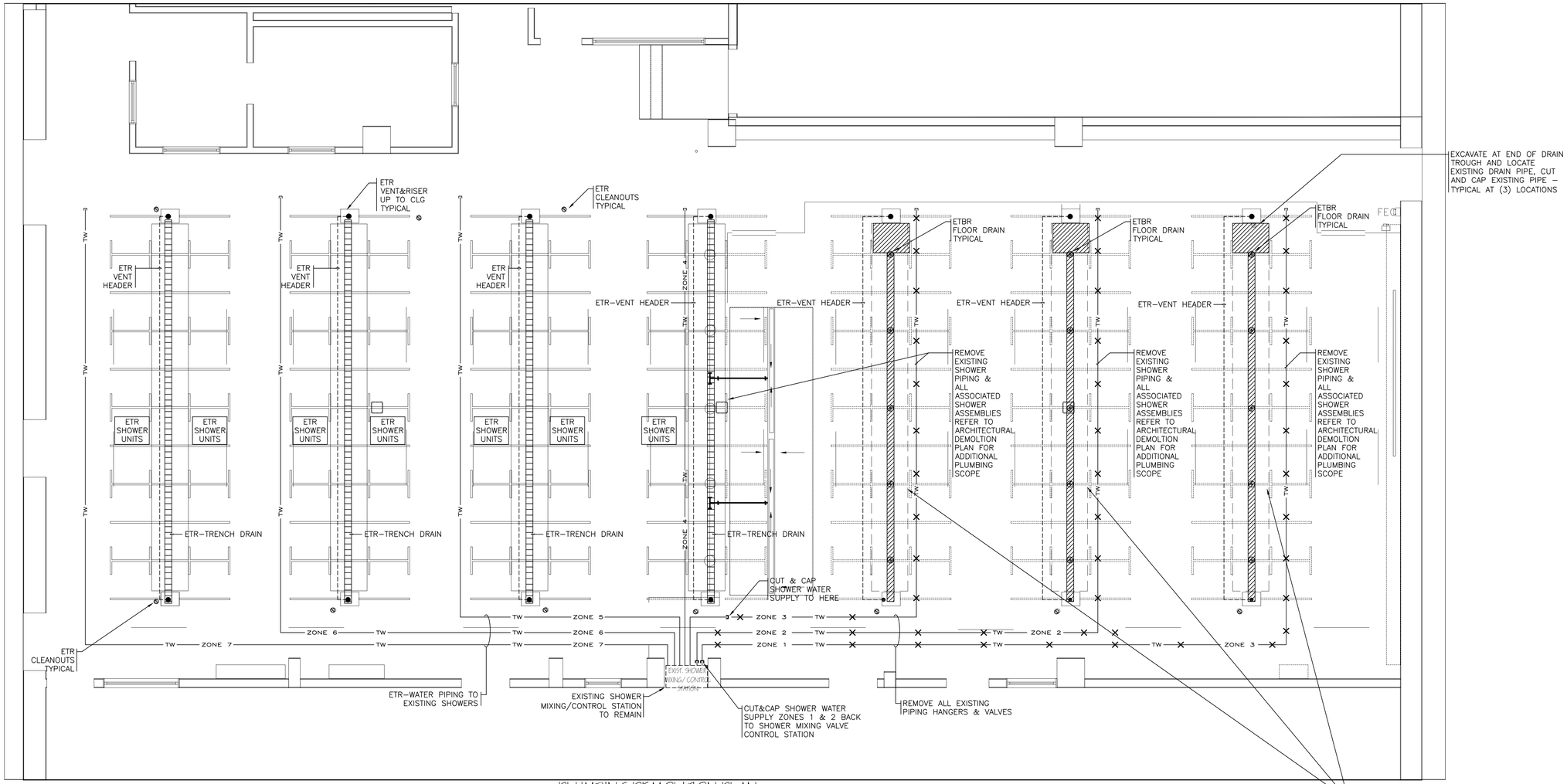
DRN BY: CSP / LSN
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE: EQUIPMENT PLAN - COSMETOLOGY LAB

DRAWING NUMBER: A5.03

JOB#: 201205



PLUMBING DEMOLITION PLAN

SCALE: 1/4"=1'0"

GIRLS VARSITY LOCKER ROOM

DEMOLITION NOTES

1. ALL NEW WORK IS DRAIN HEAVY
2. EXISTING PIPING AND FIXTURE TO REMAIN ARE DRAWN LIGHT.
3. THE LOCATIONS OF THE PIPING, FIXTURES, ELEVATIONS, ETC. HAVE BEEN TAKEN FROM THE BEST SOURCES AVAILABLE AND MUST BE VERIFIED IN THE FIELD PRIOR TO COMMENCING WORK IN RENOVATED AREAS.
4. SINCE PORTIONS OF THE EXISTING BUILDING SHALL REMAIN IN OPERATION DURING CONSTRUCTION, THE PHASING REQUIREMENTS SHALL BE MET BY THIS SUB–CONTRACTOR AND ALL REQUIRED PIPES, VALVES, AND FITTINGS NECESSARY TO ACCOMPLISH SAME SHALL BE PROVIDED. COORDINATION OF THIS VERY IMPORTANT.
5. RELOCATE ALL SOIL STACK AND VENT STACKS EXPOSED DUE TO DEMOLITION OF FIXTURES AND/OR PARTITIONS, WHEN STACKS ARE ACTIVE. RELOCATE AS DIRECTED BY ARCHITECT AND/OR ENGINEER. IT IS THE RESPONSIBILITY OF THIS SUB–CONTRACTOR TO KEEP ALL WASTE, VENT AND WATER RISERS ACTIVE DURING RELOCATION. ALL SHUT–DOWNS MUST BE APPROVED WITH OWNER AND ARCHITECT.
6. DEBRIS REMOVAL FROM THE CONSTRUCTION SITE WILL BE COMPLETED BY A PREDETERMINED ROUTE AT PREDETERMINED TIMES. COORDINATE WITH THE OWNER.
7. EXISTING PLUMBING FIXTURES TO BE REMOVED SHALL HAVE ALL ASSOCIATED WASTE, VENT & WATER PIPING REMOVED BACK TO STACKS, MAINS AND OR RISERS.

PLUMBING LEGEND

EXISTING	NEW	ABBR	DESCRIPTION
		S or W	SOIL or WASTE PIPING
		S or W	
		V	VENT PIPING
		V	
		CW	DOMESTIC COLD WATER PIPING
		HW	DOMESTIC HOT WATER PIPING
		BV	BALL VALVE
TW	TW	TW	TEMPERED WATER
		W&T	WASTE & TRAP
		CO	LINE CLEANOUT
		FCO	FLUSH FLOOR CLEANOUT

NEW	ABBR	DESCRIPTION
		PIPE CAP
		PIPE CONTINUATION
		PIPE DOWN THRU FLOOR SHOWN
		PIPE DROP
		PIPE RISE
	HB	HOSE BIBB
	W&V	WASTE & VENT PIPING
	SS	SOIL STACK
	WS	WASTE STACK
	VS	VENT STACK
	INV. EL.	INVERT ELEVATION
	NTS	NOT TO SCALE
	TD	TRENCH DRAIN

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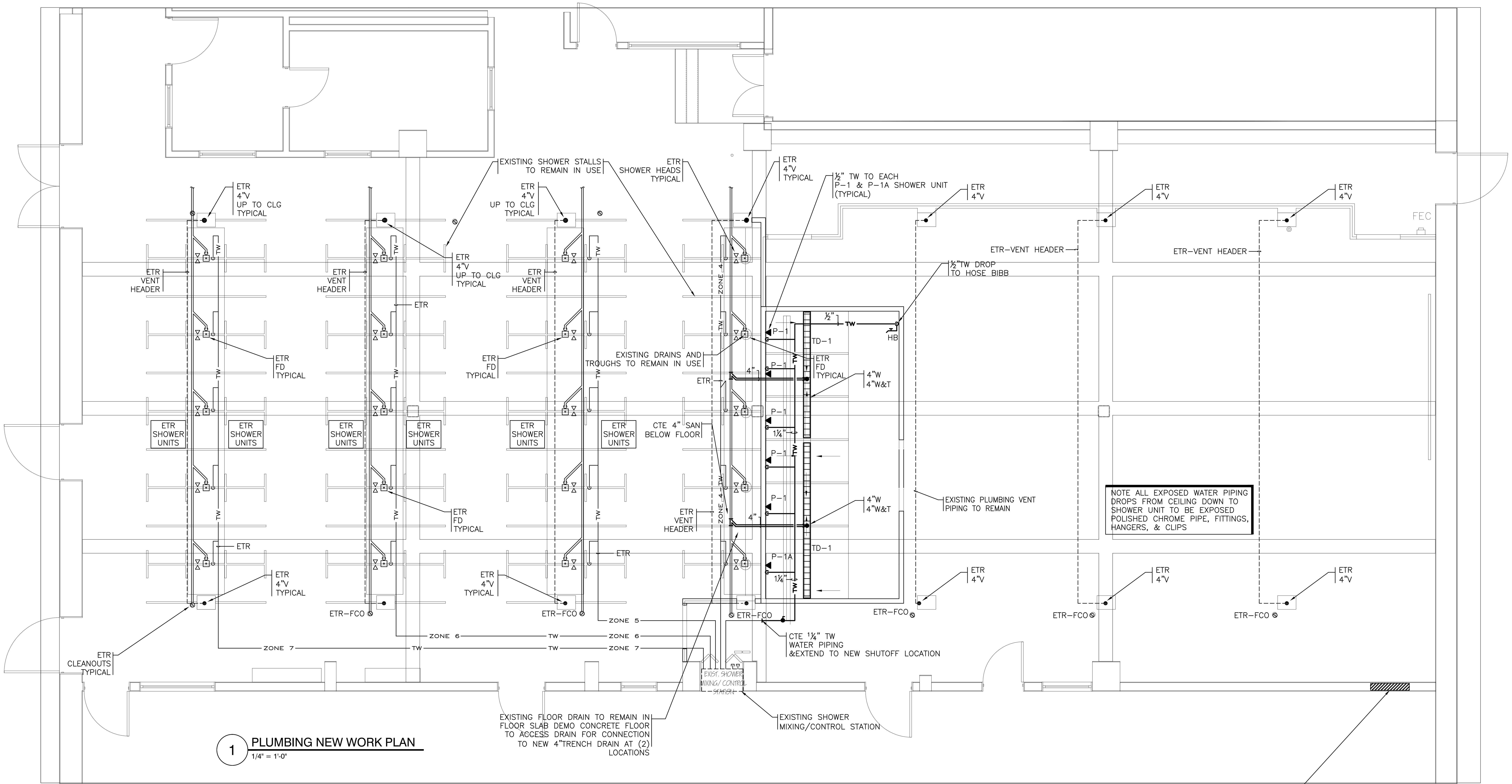
REV#:	DESCRIPTION:
REV DATE:	-
DRN BY:	SPO / CCSV
SCALE:	AS NOTED
DATE:	MAY 29, 2012
PROJECT:	WALTHAM HIGH SCHOOL CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM 617 LEXINGTON STREET WALTHAM, MA 02452
DRAWING TITLE:	PLUMBING DEMOLITION PLAN
DRAWING NUMBER:	PD0.01
JOB #:	20209



ALTERNATE NUMBER 1:
PLUMBING CONTRACTOR (FILED SUB-BIDDER) TO REMOVE EXISTING ALUMINUM RETURN AIR GRILLE AND PROVIDE NEW REGISTER NECK THROUGH-WALL TRANSITION CONNECTION, ALUMINUM RETURN AIR GRILLE AND ASSOCIATED DUCTWORK TO RECONNECT WITH EXISTING SYSTEM. VERIFY ALL DUCT AND GRILLE SIZES IN THE FIELD, REBALANCE SYSTEM TO EXISTING CFM AND COORDINATE IN FIELD WITH ARCHITECT / ENGINEER. PLUMBING CONTRACTOR (FILED SUB-BIDDER) WILL PATCH AND SEAL ALL WORK.

PLUMBING FIXTURE SCHEDULE

FIXTURE NUMBER	DESCRIPTION	FIXTURE	TYPE	MODEL	FITTING			H/C MTD.	REMARKS
					TRIM	TYPE	SUPPLY		
P-1	SHOWER	ZURN	STAINLESS STEEL SURFACE MTD	Z-7550	ZURN	15-175-639	IPS	N	1. PROVIDE CURTAIN ROD & CURTAIN
P-1A ♿	SHOWER	ZURN	STAINLESS STEEL SURFACE MTD	Z-7550	ZURN	DVH-W11-15-639 W/DIVERTER VALVE	IPS	Y	1. PROVIDE FOLD DOWN SEPT 2. PROVIDE CURTAIN ROD & CURTAIN

TRENCH DRAIN SCHEDULE

DESIGNATION	LOCATION	MANUFACTURER	MODEL	OUTLET	INLET	REMARKS
TD-1	LOCKER ROOM	ZURN PERMATRENCH DRAIN	Z-886	4"	4"	1. PROVIDE HEEL PROOF TRENCH GRATE TO SUITE- 20" LONG SECTION 2. PROVIDE END CAPS & V-4 BOTTOM OUTLET

HOSE BIBB SCHEDULE

DESIGNATION	LOCATION	MANUFACTURER	MODEL	REMARKS
HB	SEE-PLAN	ZURN	875-L7	CHROME W/ VACUUM BREAKER

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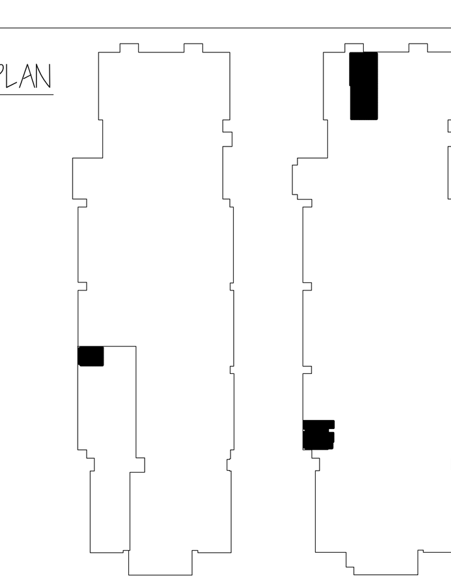
KEY PLAN
NTS



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REV DATE: -

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24 WARWICK AVENUE
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DRN BY: SPQ/ CCSV
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING NUMBER: P1.01

DRAWING TITLE: PLUMBING NEW FLOOR PLAN-TITLE IX LOCKER ROOM

JOB#: 201205

PLUMBING FIXTURE SCHEDULE

FIXTURE NUMBER	DESCRIPTION	FIXTURE	TYPE	SIZE	FITTING: TRIM	FITTING: TYPE	FITTING: SUPPLY	TRAP	CARRIER	H/C MTD.	COMMENTS
SK	KITCHEN SINKS BY OTHERS	STAINLESS STEEL	WALL HUNG	–	FAUCET FBO	CHROME PULL OUT SPRAY	McGUIRE IPS SUPPLIES W/LOOSE KEY STOPS	PROVIDE DUO STAINRER & TRAP		N	PROVIDE MIXING VALVE AT SINK LEONARD MV TM-220 CP

GREASE INTERCEPTOR SCHEDULE

DESIGNATION	LOCATION	MANUFACTURER	MODEL	OUTLET	INLET	GPM	CAP LBS	REMARKS
GT-1	KITCHEN	ZURN	Z-1170-600	3"	3"	25	50	LIFT OUT SEDIMENT BUCKET WITH ACCESS HOUSING PROVIDE VENTED FLOW FLOW CONTROL DEVICE VERIFY IN FIELD EXACT LOCATION
GT-2	KITCHEN	ZURN	Z-1170-700	3"	3"	25	70	LIFT OUT SEDIMENT BUCKET WITH ACCESS HOUSING PROVIDE VENTED FLOW FLOW CONTROL DEVICE VERIFY IN FIELD EXACT LOCATION

FLOOR DRAINS SCHEDULE

SYMBOL	MANUFACTURER	MODEL	COMMENTS
FS-A	ZURN	Z-1900-KC	FLOOR SINK TO BE 12"X12" PROVIDE TRAP PRIMER CONNECTION. PROVIDE TRAP PRIMER UNIT, PIPING & ALL REQUIRED ASSEMBLY

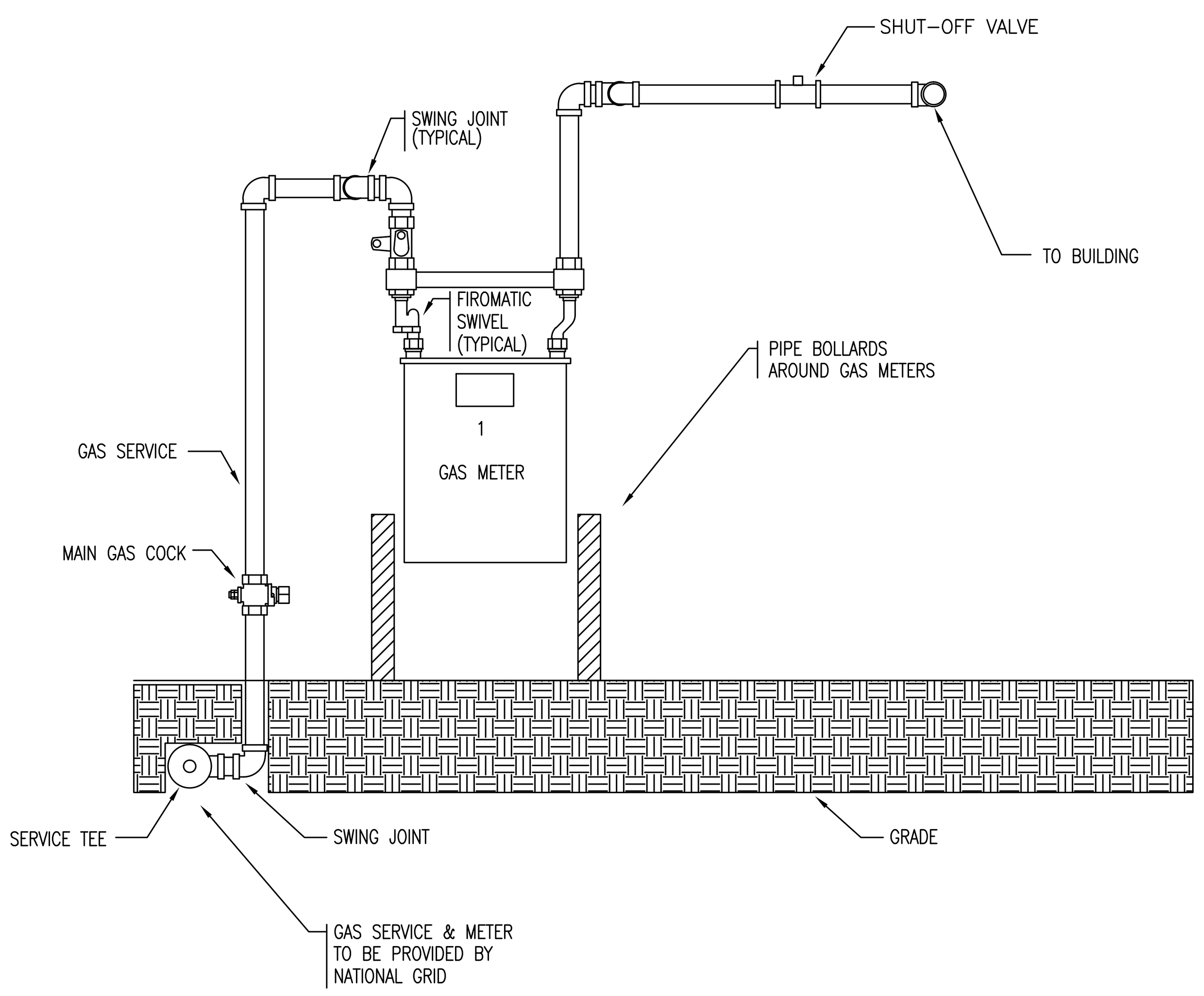
GENERAL NOTES

1. NEW WORK DRAWN HEAVY.
2. EXISTING WORK DRAWN LIGHTLY.
3. VERIFY EXISTING PIPING CONDITIONS, LOCATION, SITES PRIOR TO STARTING WORK.
4. EXISTING PIPING TO BE REMOVED IS CROSSHATCHED.
5. EXISTING PLUMBING FIXTURES TO BE REMOVED ARE SHADED.
6. EXISTING PLUMBING FIXTURES TO BE REMOVED SHALL HAVE ALL ASSOCIATED PIPING REMOVED & CAPPED BACK TO STACK, MAINS AND/OR RISER. PLUG ALL RESULTING CONNECTIONS GAS & WATERTIGHT.

PLUMBING LEGEND

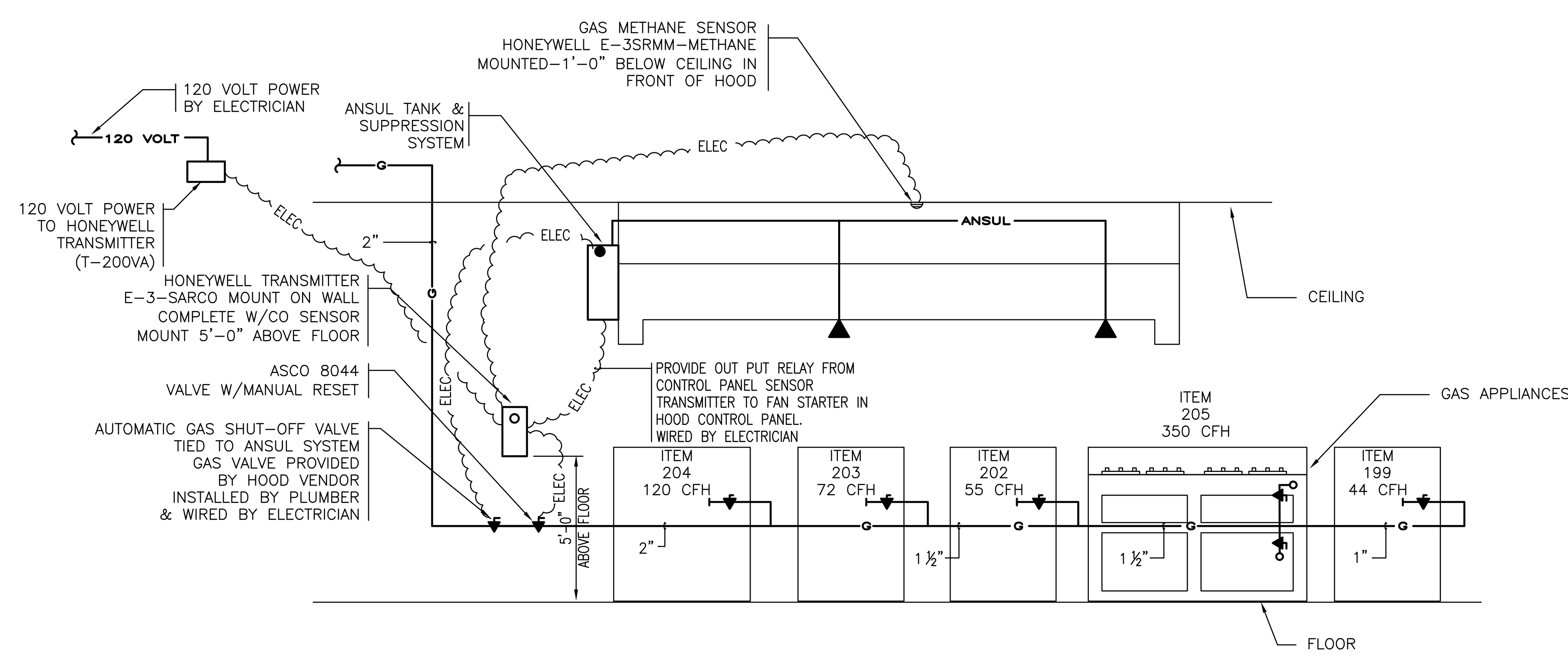
ABBR	DESCRIPTION
S or W	SOIL or WASTE PIPING
V	VENT PIPING
CW	DOMESTIC COLD WATER PIPING
HW	DOMESTIC HOT WATER PIPING
G	NATURAL GAS PIPING
AW	ACID WASTE PIPING
	PIPE TO BE REMOVED
BV	BALL VALVE
NGC	NATURAL GAS COCK
OS&Y	OUTSIDE SCREW & YOKE VALVE
CV	CHECK VALVE
DV	DRAIN VALVE
W&T	WASTE & TRAP
OED	OPEN END DRAIN
CO	LINE CLEANOUT
FCO	FLUSH FLOOR CLEANOUT
	PIPE CAP
	PIPE CONTINUATION
	PIPE UP THRU SLAB OF FLOOR ABOVE
	PIPE DOWN THRU FLOOR SHOWN
	PIPE DROP
	PIPE RISE
W&V	WASTE & VENT PIPING
SS	SOIL STACK
WS	WASTE STACK
VS	VENT STACK
INV. EL.	INVERT ELEVATION
NTS	NOT TO SCALE
ETR	EXISITNG TO REMAIN
ETBR	EXISTING TO BE REMOVE
CTE	CONNECT TO EXISTING
FBO	FURNISHED BY OTHERS
SK	SINK
EGSVB	EMERGENCY GAS SHUT-OFF VALVE BOX

(Legend columns: EXISITNG, NEW, ABBR, DESCRIPTION)



GAS METER DETAIL

NOT TO SCALE



DETAIL OF KITCHEN GAS SOLENOID C.O. AND METHANE DETECTOR DEVICES

NOT TO SCALE

ALARM SEQUENCING

METHANE	CARBON MONOXIDE
ALARM #1 – 40% LEL TURNS ON FAN	ALARM #1 – 150 PPM TURNS ON FAN
*ALARM #2 – 50% LEL TURNS OFF GAS	*ALARM #2 – 200 PPM TURNS OFF GAS
*ALARM #3 90% LEL NOTIFIES FIRE DEPT.	*ALARM #3 –225 PPM – NOTIFIES FIRE DEPT.

*ALARM #3 WILL NOTIFY LOCAL FIRE DEPARTMENT THROUGH FACP.

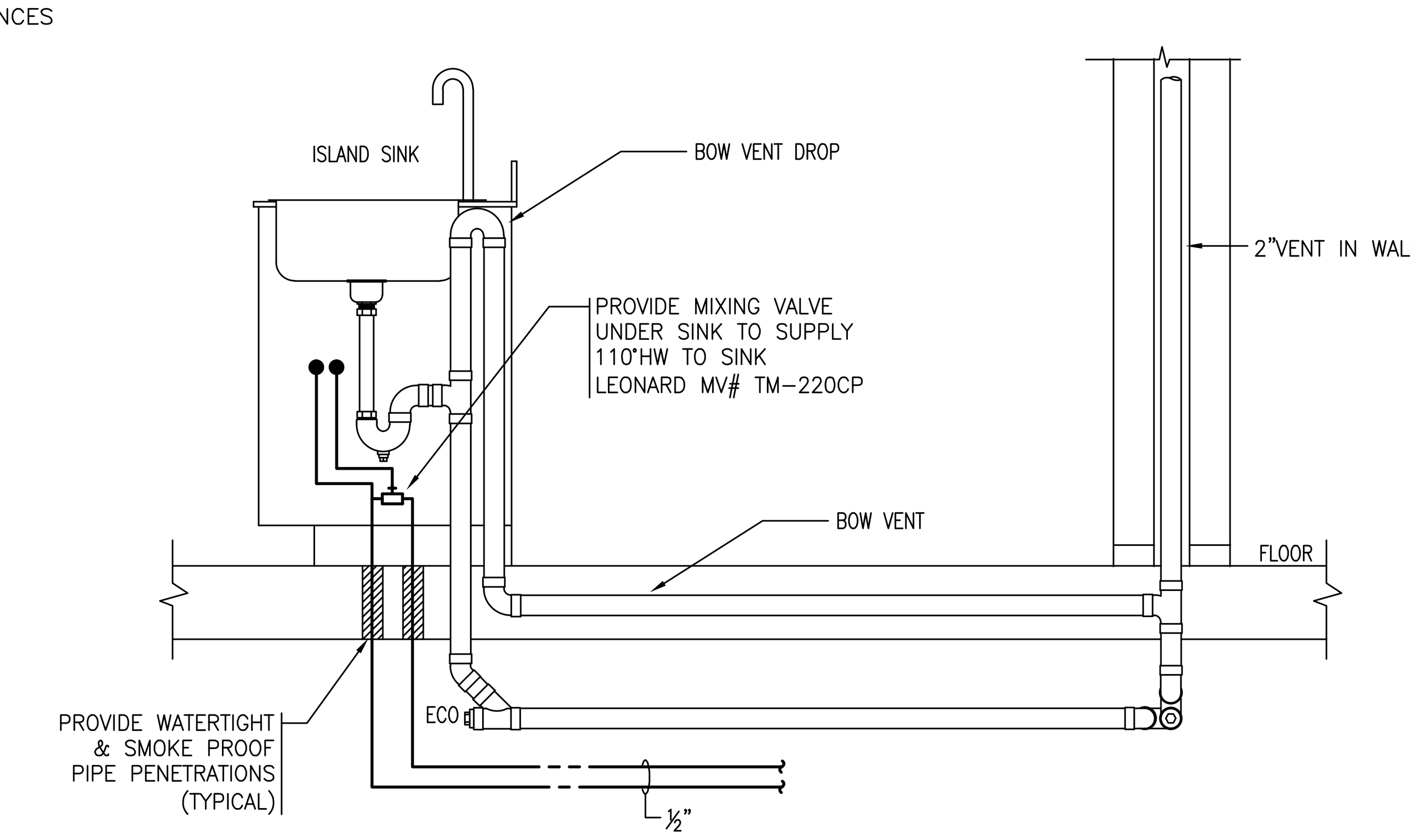
*ALARM #3 WILL NOTIFY LOCAL FIRE DEPARTMENT THROUGH FACP.

VENDOR INFO.-RMI.INC
1-781-740-1794
HONEYWELL VENDOR FOR THIS EQUIPMENT

ALL COMPONENTS FOR GAS DETECTOR SYSTEM TO BE PROVIDED BY PLUMBER & INSTALLED BY ELECTRICIAN

ALL INTERLOCKING WIRING REQUIRED TO BE PROVIDED & INSTALLED BY ELECTRICIAN. (INSTALLED IN CONDUIT.)

ALL CO & METHANE DETECTORS FROM KITCHEN EXHAUST HOOD LOCATION TO BE WIRED BACK TO HONEYWELL TRANSMITTER E-3-SARCO CONTROL UNIT.



ISLAND HANDWASHING SINK WITH BOW VENT DETAIL - (SK)-201

NOT TO SCALE

★ NOTE
WALL MOUNTED HANDWASHING SINK SIMILAR INSTALLATION LESS BOW VENT

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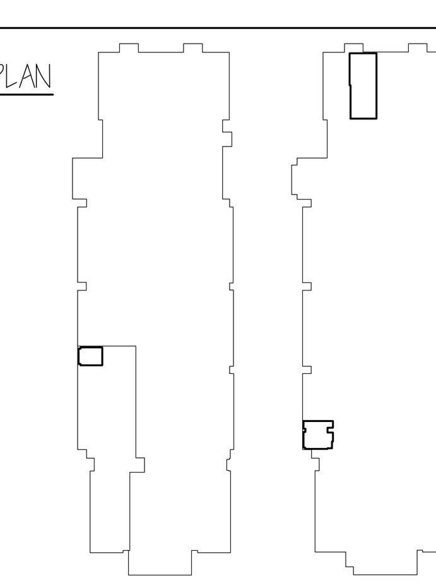
KEY PLAN
NTS



REV#: DESCRIPTION: REV DATE: -

JFF DESIGN
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24 WARWICK AVENUE
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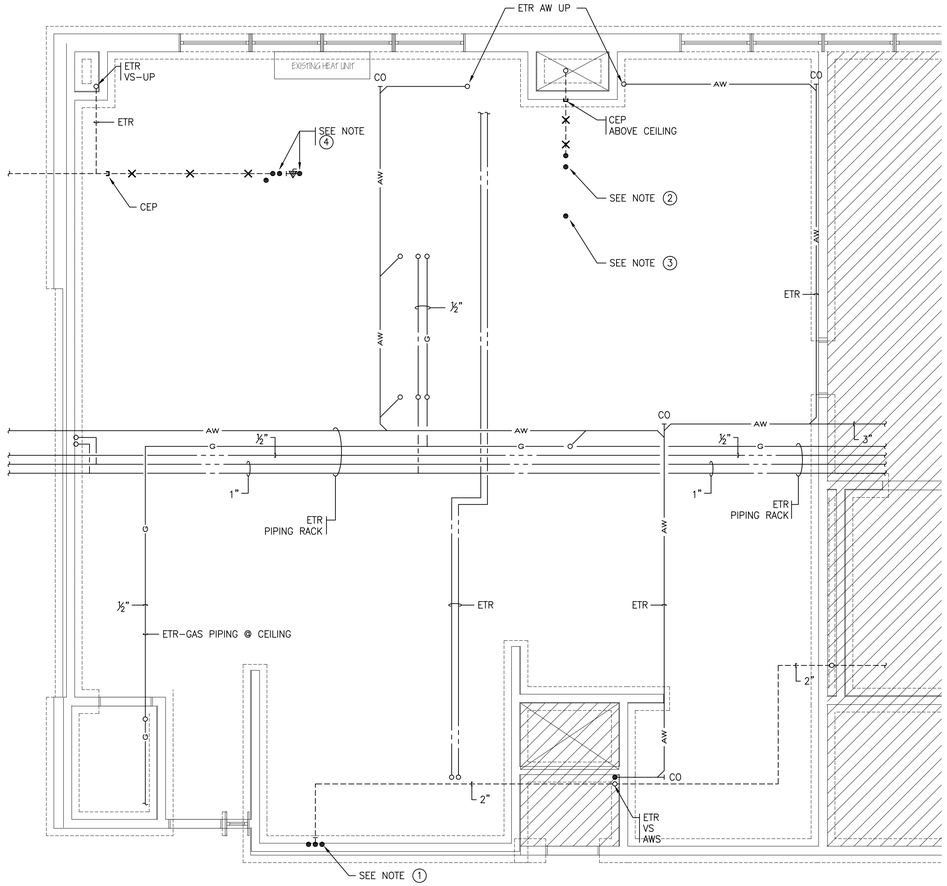
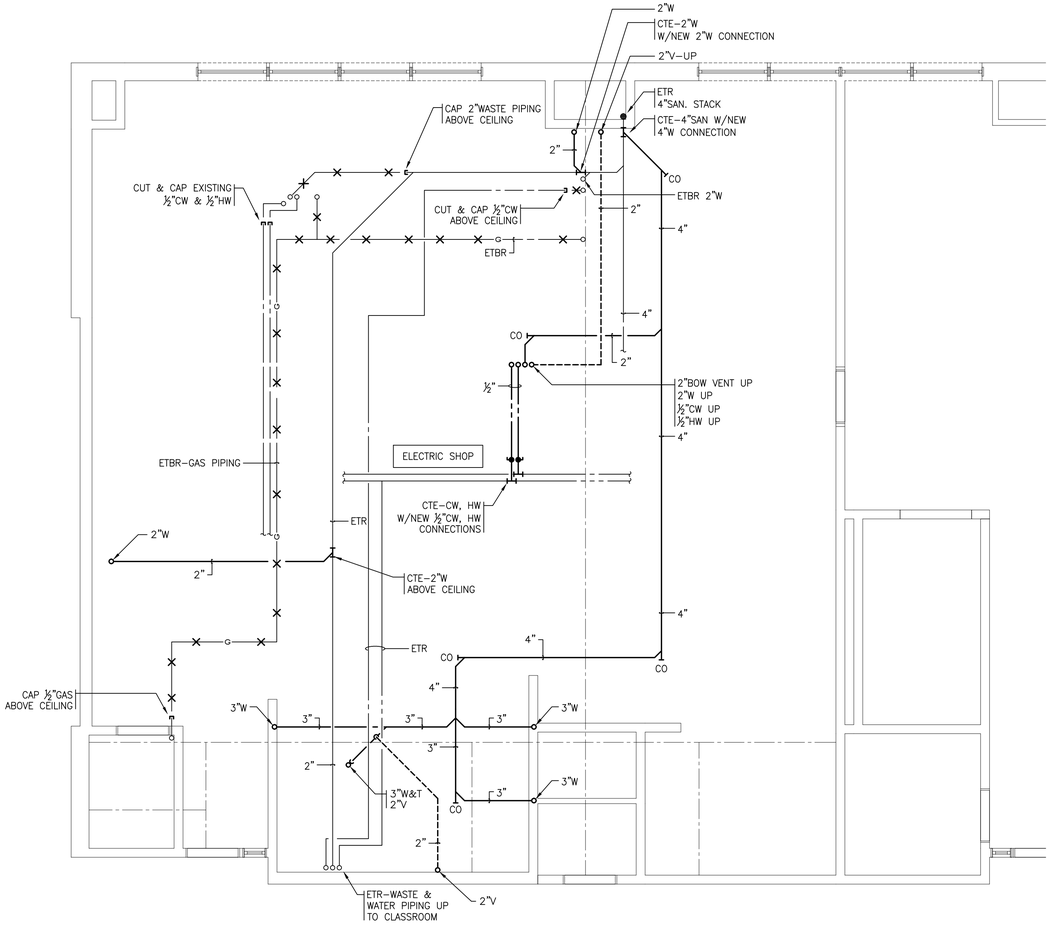
DRN BY:	SPG / CCSV
SCALE:	AS NOTED
DATE:	MAY 25, 2012
DRAWING NUMBER:	P1.02
JOB #:	201209

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE:
PLUMBING LEGEND AND DETAILS



1 PLUMBING DEMOLITION PLAN @ 2ND FLOOR CLASSROOM
1/4" = 1'-0"



2 FIRST FLOOR PLUMBING PIPING PLAN
1/4" = 1'-0"

NOTE TAGS

(1) – EXISTING 2"W&V, ½"CW & ½"HW TO REMAIN

(2) – EXISTING 2"W&V TO BE REMOVED
PLUG 2"WASTE AT FLOOR BELOW CAP
2"VENT ABOVE CEILING AS SHOWN
REMOVE ½"CW TO FLOOR BELOW AND CAP

(3) – PLUG ¾"GAS PIPING AT FLOOR BELOW

(4) – EXISTING 2"W&V, ½"HW, ½"CW & ¾"GAS TO BE REMOVED:
PLUG 2"WASTE AT FLOOR BELOW
CAP 2"VENT PIPING ABOVE CEILING AS SHOWN
REMOVE ½"CW, ½"HW & ¾"GAS BELOW AND CAP

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KEY PLAN
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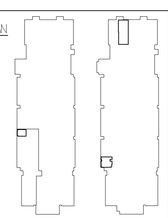

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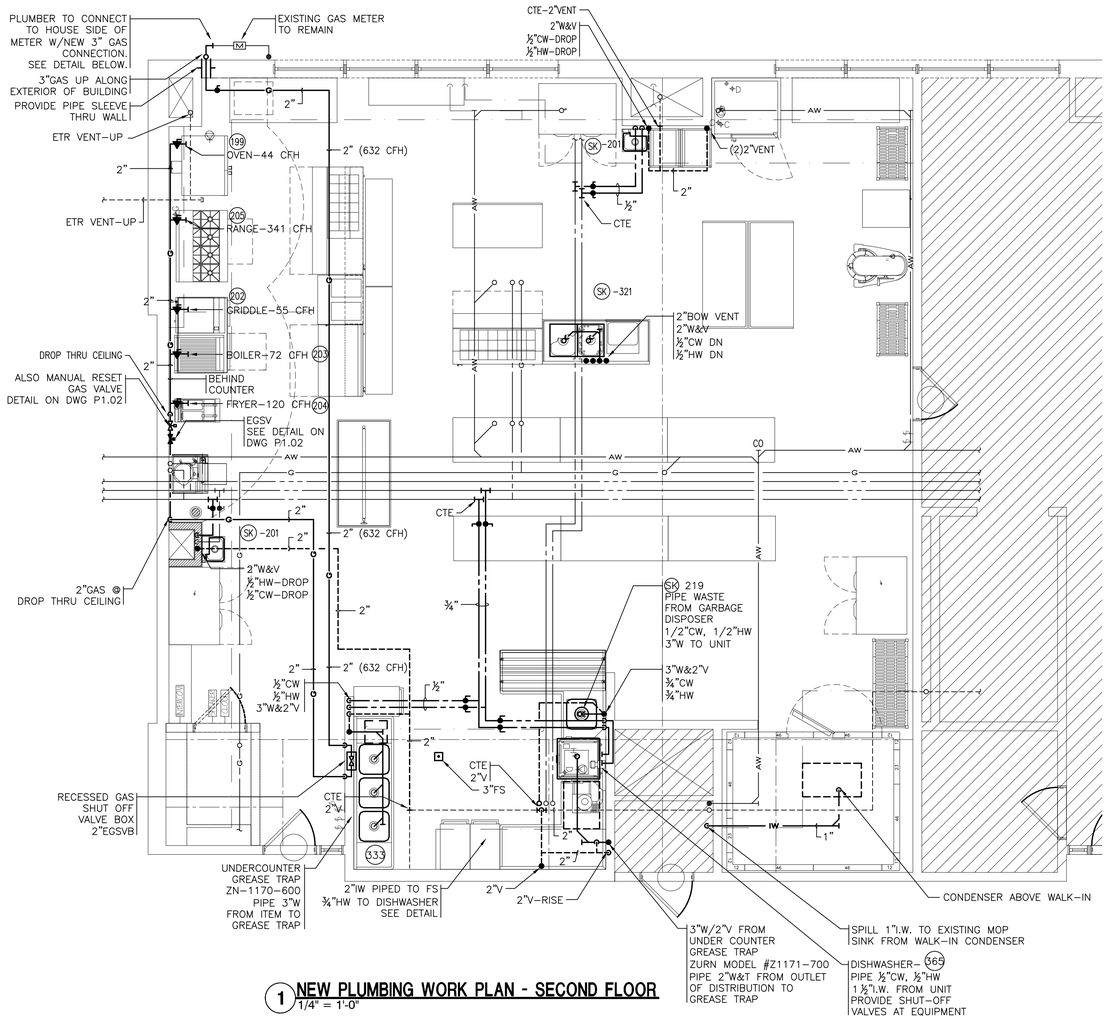
DRN BY: SPO / CCSV
SCALE: AS NOTED
DATE: MAY 29, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02492

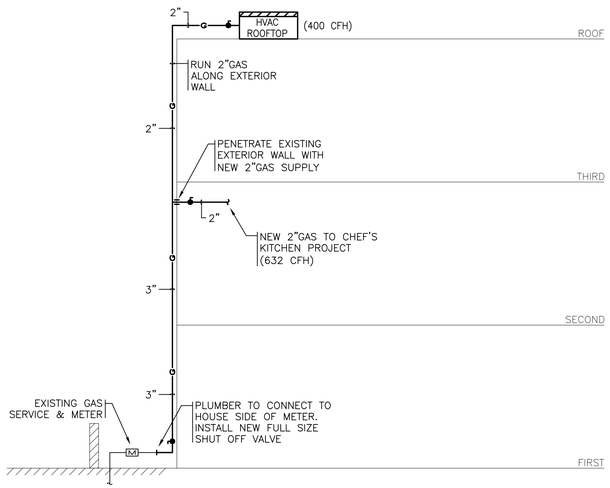
DRAWING NUMBER: P1.03

DRAWING TITLE: Plumbing Demolition Plan @ 2nd floor classroom & 1ST Floor Plumbing Piping Plan

JOB #: 201209



1 NEW PLUMBING WORK PLAN - SECOND FLOOR
1/4" = 1'-0"



DETAIL RISER OF PROPOSED NATURAL GAS DISTRIBUTION
NOT TO SCALE

EQUIPMENT SCHEDULE

Item No	Equipment Category	Qty	Manufacturer	Model Number	Utility Connections Required: Plumbing	Electrical	Gas	Finish	Power Requirements	Notes
197	Oven, Microwave	1	Panasonic	NE-3280		●		STAINLESS STEEL	208/60/1 - 30A	W/ STAND
199	Oven, Convection, Gas	1	Vulcan-Hart	VC4GD		●	●	STAINLESS STEEL	44,000 BTU 120/60/1 - 9A	
201	HAND SINK W/S-T	3	ADVANCE	7PS-79	●			STAINLESS STEEL	N/A	
202	Griddle, Gas	1	Vulcan-Hart	24RRG		●	●	STAINLESS STEEL	99,000 BTU 120/60-60/1 - 1A	
203	Broiler, Under-Fired, Gas, Counter	1	Vulcan-Hart	VACB25			●	STAINLESS STEEL	72,000 BTU	
204	Fryer, Deep Fat, Gas	1	Vulcan-Hart	1GR45AF		●	●	STAINLESS STEEL	120,000 115/60-60/1 - 9A	
205	Range, Restaurant, Gas	1	Vulcan-Hart	48S-8B		●	●	STAINLESS STEEL	279,000+ 66,000 BTU 115/60/1 - 4A	W/ SALAMANDER BROILER
206	Refrigerator, Shorty (griddle stand)	1	Turbo Air	TCBE-52SDR		●		STAINLESS STEEL	115/60/1 - 9.1A	
209	Kettle, Steam Jacketed, Counter, Elec, Tilt	1	Vulcan-Hart	K6ETT		●		STAINLESS STEEL	208/60-60/3 - 22A	
210	Stand, Kettle	1	Vulcan-Hart	VSKT30				STAINLESS STEEL	N/A	
212	Freezer, Undercounter, Compact	1	Turbo Air	TWF-48SD		●		STAINLESS STEEL	115/60/1 - 8.5A	
213	Table, Hot Food	1	Eagle Group/Metal Masters	SDHT2-208		●		STAINLESS STEEL	208/60/1 - 7.2A	
216	Dishtable, 'L' Shape, 16 gauge	1	Advance Tabco	DTS-G70-72L	●			STAINLESS STEEL	N/A	
321	Table, Prep w/ Sink	1	Advance Tabco	DL-30-72	●			STAINLESS STEEL	N/A	
322	Table, Wood Top	1	Advance Tabco	BG-306				SS/WOOD	N/A	
323	Table, Wood Top	1	Advance Tabco	BG-306				SS/WOOD	N/A	
324	Table, Overhead Mirror	1	Advance Tabco	VSS-DT-365				STAINLESS STEEL	N/A	
325	Table, Work, 18 gauge, Flat Top w/ Undershelf	4	Turbo Air	TSW-3072SS				STAINLESS STEEL	N/A	
326	Table, Work, 18 gauge, Flat Top w/ Undershelf	2	Turbo Air	TSW-3072SS				STAINLESS STEEL	N/A	
329	Shelving Unit, Starter, Plastic, Louvered	1	Cambro	ESU246064-580				STAINLESS STEEL	N/A	
332	Dishtable, 'L' Shape, 16 gauge	1	Advance Tabco	DTC-K60-72R	●			STAINLESS STEEL	N/A	
333	Sink, NSF, 3 comp, 18 gauge	1	Turbo Air	TSB-3-D2	●			STAINLESS STEEL	N/A	
334	Table, Enclosed Base, Dish Cabinet	2	Advance Tabco	DC-186				STAINLESS STEEL	N/A	
335	Overshelf, Table Mount	1	Advance Tabco	ODS-12-72				STAINLESS STEEL	N/A	
337	Overshelf, Table Mount	1	Advance Tabco	ODS-12-48				STAINLESS STEEL	N/A	
338	Overshelf, Table Mount	1	Advance Tabco	ODS-12-36				STAINLESS STEEL	N/A	
339	Dishtable, Sorting Shelf	1	Advance Tabco	DTA-79				STAINLESS STEEL	N/A	
349	Refrigerator, Walk-In Unit	1	American Panel Corporation	9'-8" x 7'-9"		●		WHITE POLY	MONITOR: 115V, 5.2A LIGHTING: 9.1A MAX.	COMPRESSOR POWER REQ NOT YET KNOWN.
350	Door, Walk-In Cooler/Freezer	1	American Panel Corporation	STANDARD DOOR				SS HARDWARE	N/A	
351	EXISTING FLOOR MIXER	1	EXISTING	EXISTING		●		STAINLESS STEEL	UNKNOWN	
352	Rack, Bun Pan	2	Channel Manufacturing	401AKD				STAINLESS STEEL	N/A	
354	Shelving Unit, Starter, Plastic, Louvered	1	Cambro	CSU41366-480				STAINLESS STEEL	N/A	
355	Cart, Bussing	3	Cambro	BC230-110				STAINLESS STEEL	N/A	
357	Freezer, Reach-In	2	Turbo Air	M3F47-2		●		STAINLESS STEEL	115/60/1 - 10.9A	
360	Refrigerator, Reach-In	1	Turbo Air	M3R47-2		●		STAINLESS STEEL	115/60/1 - 9.2A	
362	Table, Work, 18 gauge, Back Splash w/ Undershelf	1	Turbo Air	TSW-3060SB				STAINLESS STEEL	N/A	
363	Refrigerator, SANDWICH UNIT	1	Turbo Air	MST-60-24		●		STAINLESS STEEL	115/60/1 - 8.9A	
364	SANDWICH UNIT	1	Turbo Air	MST-72		●		STAINLESS STEEL	115/60/1 - 9.9A	
365	VENTLESS DISHWASHER	1	Hobart	AM15VL-2				STAINLESS STEEL	208/60/3 - 46.4A	
366	**ELECTRIC COMBI OVEN – HOLD FOR JFF**	1	RATIONAL	CM-62	●	●		STAINLESS STEEL	208/60/3 - 59A (120/50-60/1 HOOD)	W/ 60.70.677 ULTRAVENT HOOD
367	EXISTING PROOFING BOX	1	EXISTING	EXISTING		●		EXISTING	UNKNOWN	
368	FUTURE MANUAL DELI SLICER	1	GLOBE (OR SIMILAR)	3600P		●		STAINLESS STEEL	115/60/1 - 7A	

NOTE
ALL KITCHEN EQUIPMENT TO BE FURNISHED & INSTALLED BY OTHERS UNLESS NOTED.
PLUMBER TO MAKE ALL FINAL CW, HW, WASTE, VENT & GAS CONNECTION AS REQUIRED.
VERIFY ALL FINAL PLUMBING PIPING CONNECTIONS WITH EQUIPMENT VENDORS.

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KEY PLAN
NTS

REV#: DESCRIPTION: REV DATE: -

JFF DESIGN
ARCHITECTS & PLANNERS
VC 781-899-6908
FAX 781-899-3050
EMAIL: ARCHITECTS@JFFDESIGN.COM
24 WARWICK AVENUE
WALTHAM, MA 02452

DRN BY: SPG/CCSN
SCALE: AS NOTED
DATE: MAY 25, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE: NEW PLUMBING WORK PLAN-2nd FLOOR-CHEF'S KITCHEN RENOVATION

DRAWING NUMBER: P1.04

JOB#: 201209

PLUMBING FIXTURE SCHEDULE

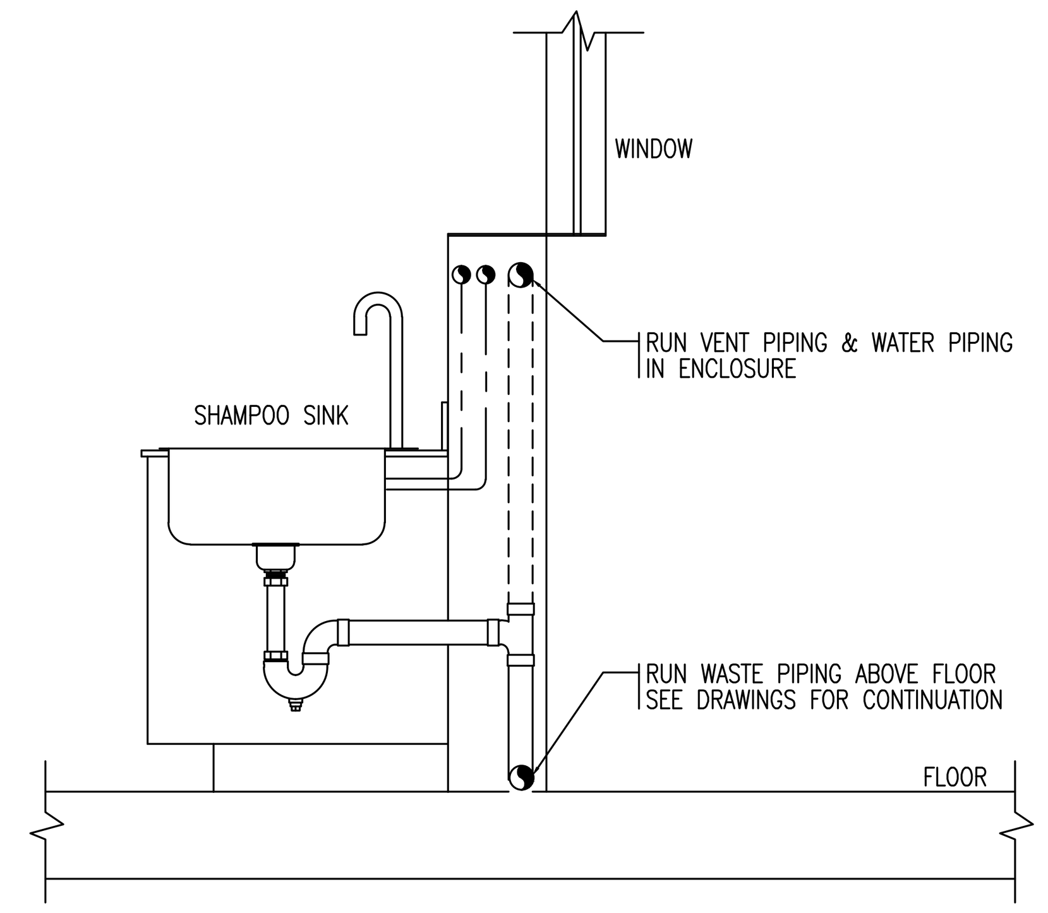
FIXTURE NUMBER	DESCRIPTION	FIXTURE	TYPE	SIZE	FITTING: TRIM	FITTING: TYPE	FITTING: SUPPLY	TRAP	CARRIER	H/C MTD.
P-1	SHAMPOO SINKS BY OWNER	VITREOUS CHINA	WALL HUNG	–	FAUCET BY OWNER	CHROME PULL OUT SPRAY	McGUIRE IPS SUPPLIES W/LOOSE KEY STOPS	PROVIDE DUO STAINRER & TRAP	N/A	N

HAIR INTERCEPTOR

DESIGNATION	LOCATION	MANUFACTURER	MODEL	OUTLET	INLET	GPM	CAP	REMARKS
HT-1	CLASSROOM	ZURN	1180	3"	3"	15		FLOOR MOUNTED – 2 REQUIRED

GENERAL NOTES

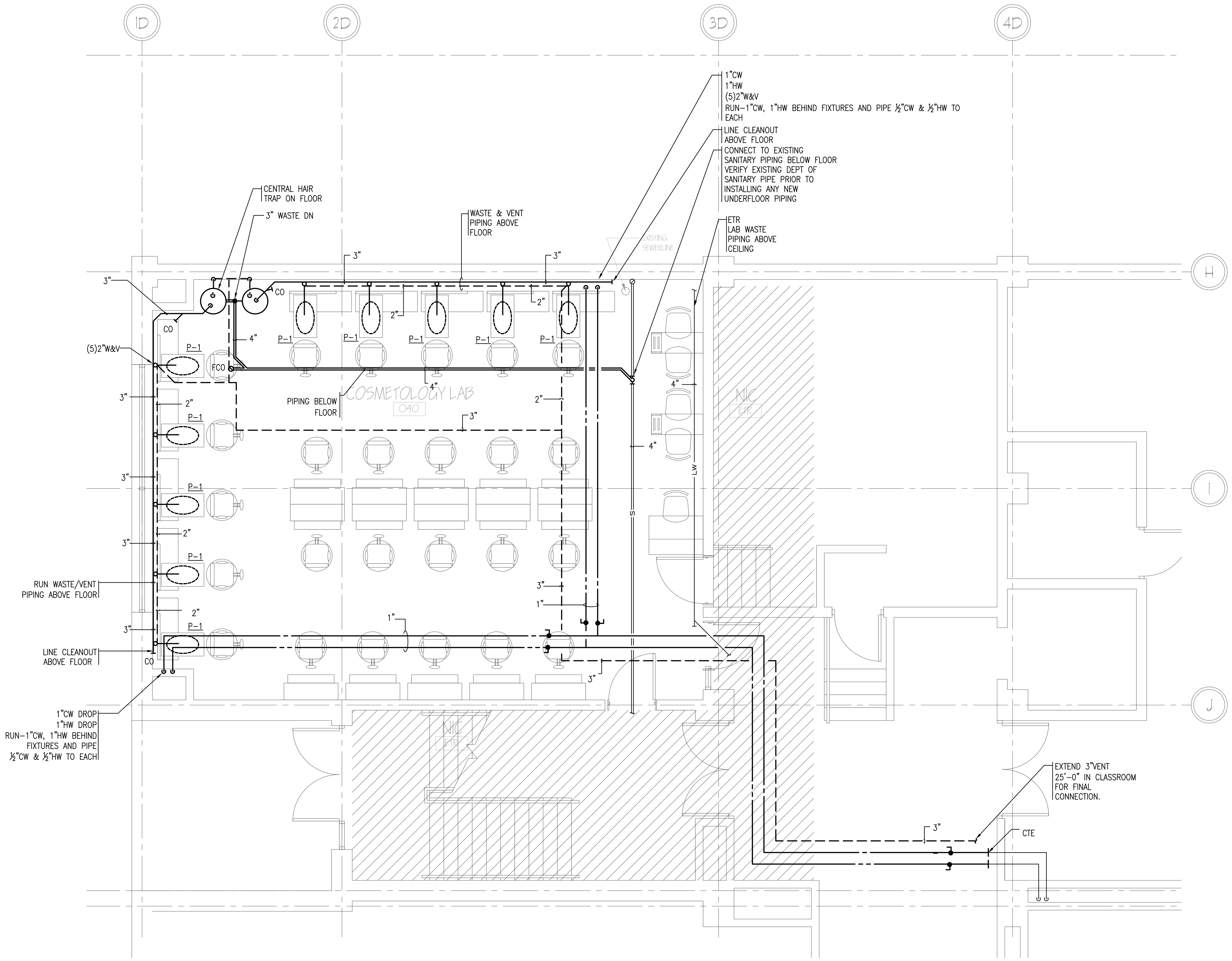
1. NEW WORK DRAWN HEAVY.
2. EXISTING WORK DRAWN LIGHTLY.
3. VERIFY EXISTING PIPING CONDITIONS, LOCATION, SITES PRIOR TO STARTING WORK.
4. EXISTING PIPING TO BE REMOVED IS CROSSHATCHED.
5. EXISTING PLUMBING FIXTURES TO BE REMOVED ARE SHADED.
6. EXISTING PLUMBING FIXTURES TO BE REMOVED SHALL HAVE ALL ASSOCIATED PIPING REMOVED & CAPPED BACK TO STACK, MAINS AND/OR RISER. PLUG ALL RESULTING CONNECTIONS GAS & WATERTIGHT.



SHAMPOO SINK
NTS

PLUMBING LEGEND

EXISITNG	NEW	ABBR	DESCRIPTION
		S or W	SOIL or WASTE PIPING
		S or W	SOIL or WASTE PIPING BELOW FLOOR
		V	VENT PIPING
		CW	DOMESTIC COLD WATER PIPING
		HW	DOMESTIC HOT WATER PIPING
— LW —		LW	LAB WASTE PIPING
			PIPE TO BE REMOVED
		BV	BALL VALVE
		OS&Y	OUTSIDE SCREW & YOKE VALVE
		CV	CHECK VALVE
		DV	DRAIN VALVE
		W&T	WASTE & TRAP
		OED	OPEN END DRAIN
		CO	LINE CLEANOUT
		FCO	FLUSH FLOOR CLEANOUT
			PIPE CAP
			PIPE CONTINUATION
			PIPE UP THRU SLAB OF FLOOR ABOVE
			PIPE DOWN THRU FLOOR SHOWN
			PIPE DROP
			PIPE RISE
		W&V	WASTE & VENT PIPING
		SS	SOIL STACK
		WS	WASTE STACK
		VS	VENT STACK
		INV. EL.	INVERT ELEVATION
		NTS	NOT TO SCALE
		ETR	EXISITNG TO REMAIN
		ETBR	EXISITNG TO BE REMOVE
		CTE	CONNECT TO EXISTING



1 PLUMBING FIRST FLOOR PLAN
1/4" = 1'-0"

EQUIPMENT SCHEDULE

Item No	Equipment Category	Qty	Manufacturer	Model Number	Utility Connections Required: Plumbing	Electrical	N/A	FINISH	POWER REQUIREMENTS	NOTES
101	STYLING CHAIR	25	KAEMARK	W-64HR				BLACK	N/A	W/ HEADREST, MANNEQUIN SIMULATOR, HKIO-AS BASE, & 260 FOOTREST
102	STYLE STATION (DOUBLE)	5	KAEMARK	105-2		●		4623-60 W/ 4779-60 TOP	120V 20A GFI (x2)	DEDICATED 20A CIRCUIT EACH STATION
103	STYLE STATION (SINGLE)	5	KAEMARK	105-1		●		4623-60 W/ 4779-60 TOP	120V 20A GFI	DEDICATED 20A CIRCUIT EACH STATION
104	WET STATION	10	KAEMARK	SC-448		●		4623-60 W/ 4779-60 TOP	120V 20A GFI	DEDICATED 20A CIRCUIT EACH STATION
105	SHAMPOO BOWL	10	BELVEDERE	PS-3100-BL	●			BLACK	N/A	W/ 403C VACUUM BREAKER
106	HOOD DRYER	10	BELVEDERE	B900S		●		BLACK	120V 10A	W/ 17009B DRYER CART
107	FACIAL STEAMER	1	S&A	1000B		●		WHITE	120V 5.8A	NOT SHOWN ON PLAN
108	NAIL TABLE	10	KAYLINE	401		●		WHITE	120V	NOT ALL UNITS SHOWN ON PLAN
109	FATIGUE MAT	25	UNIQUE MAT	35250NT				BLACK	N/A	NOT SHOWN ON PLAN
110	DESK	1	KAEMARK	J-40-4				4779-60 W/ 4623-60 TRIM	N/A	

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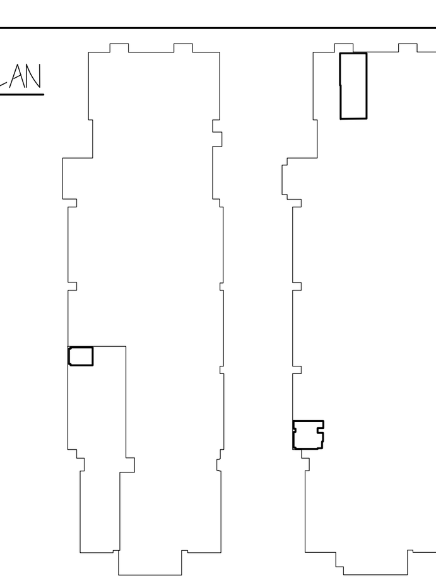
KEY PLAN
NTS



REV#: DESCRIPTION:

REV DATE: -

JFF DESIGN
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24 WARWICK AVENUE
WALTHAM, MA 02452

DRN BY: SPQ/ CCSV
SCALE: AS NOTED
DATE: MAY 23, 2012

PROJECT: WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING NUMBER: P1.05

DRAWING TITLE: PLUMBING FIRST FLOOR PLAN , LEGEND, GENERAL NOTES, DETAILS & SCHEDULES

JOB#: 201205

MECHANICAL SYMBOL LEGEND

ALL ITEMS SHOWN ARE NOT NECESSARILY USED ON THIS PROJECT

PIPING

- HWS — HEATING HOT WATER SUPPLY
- HWR — HEATING HOT WATER RETURN
- L — LIQUID REFRIGERANT LINES
- S — SUCTION REFRIGERANT LINES
- CD — CONDENSATE DRAIN
- PIPE TURNING DOWN
- TEE OFF TOP
- TEE OFF BOTTOM
- DROP AND RUN
- DROP AND TURN
- TEE UP
- TEE DOWN
- CLEAN-OUT FOR CONDENSATE DRAIN
- PIPE CAP
- UNION
- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- 3-WAY VALVE
- CIRCUIT SETTER w/ GAGE PORT
- CHECK VALVE (SWING TYPE)
- PRESSURE REDUCING VALVE
- PLUG VALVE
- MULTI PURPOSE VALVE
- AUTOMATIC BALANCING VALVE
- PUMP
- STRAINER w/ BLOW DOWN (INLINE)
- EPDM FLEXIBLE CONNECTION
- EPDM FLEXIBLE CONNECTION
- UP/DN — PITCH UP/DN. IN DIRECTION OF FLOW
- ANCHOR
- PIPE GUIDE
- EXPANSION JOINT
- WALL SLEEVE
- PIPE CLEANOUT
- UNION
- DIRECTION OF FLOW
- FS — FLOW SWITCH
- FLOW MEASURING STATION
- SAFETY RELIEF VAVLE PIPE TO FLOOR DRAIN
- CONTROL VALVE ACTUATOR
- MANUAL NON-RISING
- MANUAL LEVER
- THERMOMETER (TYP.)
- PRESSURE GAGE w/ STOP
- MANUAL AIR VENT
- AUTOMATIC AIR VENT OR VACUUM RELIEF
- FS1 — COMBINATION FIRE/SMOKE DAMPER
- FD — FIRE DAMPER
- SD — SMOKE DAMPER
- VD — VOLUME DAMPER (MANUAL)

DUCTWORK

- SUPPLY CEILING DIFFUSER THROW PATTERN
- RETURN CEILING REGISTER
- CEILING EXHAUST FAN WITH FLEXIBLE CONNECTION
- SIDE WALL GRILLE/REGISTER
- FLOOR GRILLE/REGISTER
- SUPPLY DUCT UP
- SUPPLY DUCT DOWN
- RETURN/EXHAUST DUCT UP
- RETURN/EXHAUST DUCT DN.
- MITERED ELBOW TURNING VANES
- STANDARD RADIUS ELBOW (R=W) — R, W
- STANDARD DUCT TAKE-OFF W/ BRANCH DAMPERS
- BULLHEAD SPLIT SUPPLY — DR
- BULLHEAD CONVERGE RETURN/EXHAUST
- HOIZINTAL OFFSET
- FLEXIBLE CONNECTION (6" NEOPRENE)
- ACOUSTICALLY LINED DUCT
- VD — VOLUME DAMPER (OPPOSED BLADE TYPE)
- M — MOTORIZED CONTROL DAMPER
- BDD — BACK DRAFT DAMPER
- FD — DYNAMIC FIRE DAMPER HORIZONTAL
- FD — DYNAMIC FIRE DAMPER VERTICAL
- OA — OUTSIDE AIR MEASUREMENT STATION
- DUCT CAP
- ACCESS PANEL IN BOTTOM OR SIDE OF DUCT — A/P
- TRANSITION - ECCENTRIC
- TRANSITION - CONCENTRIC
- RECTANGULAR TO ROUND TRANSITION
- EXHAUST/RETURN/INTAKE
- SUPPLY AIR BLOW DIRECTION

ABBREVIATIONS

AC	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AF	AIR FILTER
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
ATC	AUTOMATIC TEMPERATURE CONTROL
AS	AIR SEPARATOR
AV	AIR VENT
BD	BAROMETRIC DAMPER
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNITS
BV	BALL VALVE
CC	COOLING COIL
CD	CEILING SUPPLY DIFFUSER
CFM	CUBIC FEET PER MINUTE
CP	CONTROL PANEL
CO	CLEAN OUT
COP	CENTER OF PIPE
CR	CEILING RETURN DIFFUSER
CTR	CONTRACTOR
CUH	CABINET UNIT HEATER
CU	CONDENSING UNIT
DB	DRY BULB
DIA	DIAMETER
DIFF	DIFFUSER
DN	DOWN
DX	DIRECT EXPANSION
DWG	DRAWING
E	EXISTING
EAT	ENTERING AIR TEMPERATURE
EBB	ELEC BASEBOARD RADIATION
EFF	EFFICIENCY
EF	EXHAUST FAN
ELEC	ELECTRICAL
ELV	ELEVATION
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EWH	ELECTRIC WALL HEATER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
°F	DEGREES FAHRENHEIT
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FMS	FLOW MEASURING STATION
FPM	FEET PER MINUTE
FTR	FINNED TUBE RADIATION
FT	FEET
GAL	GALLONS
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
GV	GATE VAVLE
HC	HEATING COIL
HP	HORSEPOWER
HP	HEAT PUMP
HRV	HEAT RECOVERY VENTILATOR
HVAC	HEATING, VENTILATION, & AIR CONDITIONING
HW	HOT WATER
HX	HEAT EXCHANGER
Hz	HERTZ
IN	INCHES
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LF	LINEAR FEET
LWT	LEAVING WATER TEMPERATURE
MBH	THOUSANDS OF BTU'S PER HOUR
MD	MOTORIZED DAMPER
MECH	MECHANICAL
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIAMETER
PD	PRESSURE DROP
Ph	PHASE
R	RETURN
RA	RETURN AIR
REF	ROOF EXHAUST FAN
REQ'D	REQUIRED
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RH	REHEAT COIL
RPM	REVOLUTIONS PER MINUTE
RR	RETURN REGISTER
RTU	ROOF TOP UNIT
S	SUPPLY
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SqFt	SQUARE FEET
SFD	SMOKE/FIRE DAMPER
SP	STATIC PRESSURE
SQ	SQUARE
SR	SUPPLY REGISTER
SST	SATURATED CONDENSING TEMP
STL	STEEL
T	THERMOSTAT
T.B.D.	TO BE DEMOLISHED
TYP.	TYPICAL
UC	UNDERCUT DOOR 3/4" (MIN)
UH	UNIT HEATER
V	VOLTS
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
W/	WITH
W/O	WITHOUT
WB	WET BULB TEMPERATURE
WG	WATER GAUGE
WH	WATER HEATER
ZV	ZONE VALVE

GENERAL SYMBOL LEGEND

- (S) — SWITCH
- (S) — TEMPERATURE SENSOR
- (T) — NEW WALL THERMOSTAT

HVAC GENERAL NOTES

1. THESE DRAWINGS ARE SCHEMATIC AND ARE INTENDED TO CONVEY A FULLY FUNCTIONAL HVAC SYSTEM. DRAWINGS DEPICT THE GENERAL LOCATION OF THE NEW HVAC COMPONENTS AND EXACT LOCATIONS SHALL BE FIELD COORDINATE WITH ALL TRADES AND CONDITIONS. HVAC CONTRACTOR SHALL PROVIDE ALL NECESSARY ACCESSORIES AND DEVICES, WHETHER SPECIFICALLY SHOWN OR NOT, TO PROVIDE PROPER OPERATION WITH FULL BALANCING AND ADJUSTING PER QUANTITIES NOTED ON PLANS AND IN SCHEDULES.

2. CONTRACTOR SHALL EXAMINE THE CONTRACT DOCUMENTS AND CONDUCT A COMPLETE FIELD SURVEY TO FAMILIARIZE HIMSELF WITH ALL THE REQUIREMENTS OF THE PROJECT AND SHALL NOTIFY THE OWNER OF ANY OBSERVED FAULTS AND AMBIGUITY IN THE CONTRACT DOCUMENTS SO THAT THE MATTER MAY BE RESOLVED PRIOR TO SUBMISSION OF BIDS.

3. BY SUBMISSION OF BID, THE CONTRACTOR SHALL ACKNOWLEDGE ACCEPTANCE OF THE CONTRACT DOCUMENTS AS AN ADEQUATE DEFINITION OF THE SCOPE OF WORK AND EXTRA COST CLAIMS BASED ON INADEQUACY OF CONTRACT DOCUMENTS WILL NOT BE CONSIDERED.

4. THE SUBMISSION OF BID SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC, WHICH AFFECT THIS WORK AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION

5. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

6. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT, AND SERVICES NECESSARY FOR COMPLETE AND SAFE INSTALLATION OF HVAC IN FULL CONFORMITY WITH REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION, ALL AS INDICATED ON DRAWINGS AND/OR HEREIN SPECIFIED FOR THE SYSTEMS INCLUDED. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER. INCLUDE ALL COSTS FOR PERMITS, LICENSES, CERTIFICATES, FILING AND INSPECTIONS REQUIRED BY AUTHORITIES HAVING JURISDICTION.

7. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

8. INSTALLATION OF ALL EQUIPMENT AND THEIR ACCESSORIES SHALL BE PER MANUFACTURER'S PUBLISHED RECOMMENDATIONS.

9. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED.

10. CONTRACTOR SHALL VERIFY VOLTAGES AND POWER REQUIREMENTS FOR ALL EQUIPMENT AND SHALL COORDINATE WITH THE ELECTRICAL CONTRACT DRAWINGS PRIOR TO SUBMISSION OF SHOP DRAWINGS AND PURCHASE OF EQUIPMENT.

11. MOTOR CONTROLLERS (STARTERS) OR COMBINATION STARTER/DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT SHALL BE FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR EXCEPT THOSE THAT ARE FURNISHED AND WIRED AT THE FACTORY.

12. PROVIDE ROOF CURBS FOR ALL ROOF MOUNTED EQUIPMENT AND PENETRATIONS.

13. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OF SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL STEEL FRAMING. ALL MISCELLANEOUS STRUCTURAL SUPPORTS REQUIRED FOR HVAC EQUIPMENT INSTALLATION SHALL BE PROVIDED BY THE HVAC SUBCONTRACTOR.

14. HVAC CONTRACTOR SHALL COORDINATE ALL WALL, CEILING, FLOOR, ROOF AND BEAM PENETRATIONS WITH ARCHITECT AND STRUCTRUAL ENGINEER PRIOR TO FABRICATION OR INSTALLATION.

15. SEAL OPENINGS AROUND DUCTS AND PIPING THOUGH PARTITIONS WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NON-COMBUSTIBLE MATERI

16. NEW DUCTWORK SHALL BE FABRICATED FROM GALVANIZED SHEET METAL IN ACCORDANCE WITH 'SMACNA DUCT CONSTRUCTION STANDARD', CURRENT EDITION. TRANSVERSE JOINTS SHALL BE 'DUCTMATE' OR APPROVED EQUAL.

17. INSTALL FIRE DAMPERS WHERE NECESSARY AS PER NFPA, LOCAL CODES AND MANUFACTURER'S RECOMMENDATIONS. PROVIDE ACCESS PANEL/DOORS TO FIRE DAMPERS WHERE REQUIRED.

18. PROVIDE AIR TURNING DEVICES IN DUCTWORK AT ANY CHANGES IN DIRECTION, AND VOLUME DAMPERS IN ALL DUCTWORK BRANCH-TAKE OFFS. PROVIDE ACCESS PANEL/DOORS TO VOLUME DAMPERS WHERE REQUIRED

19. REFER TO THE SCHEDULES FOR ACCEPTABLE REGISTERS, GRILLES AND DIFFUSERS. COORDINATE FINISHES AND STYLES WITH THE ADJACENT CEILINGS AND WALL AS NOTED ON ARCHITECTURAL PLANS AND SCHEDULES. REFER TO THE PROJECT ARCHITECT FOR ADDITIONAL INFORMATION.

20. EXACT ELEVATION FOR SIDE WALL REGISTERS AND GRILLES SHALL BE APPROVED BY THE ARCHITECT BEFORE INSTALLATION.

21. ALL ROOF CUTTING, FLASHING, SEALING, ETC. TO BE ACCOMPLISHED BY A ROOFING CONTRACTOR APPROVED BY THE ROOF MANUFACTURER AND INSTALLED IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATION SO AS NOT TO VOID ROOF WARRANTY.

22. THE CONTRACTOR SHALL THOROUGHLY CLEAN HIS WORK AREA DAILY. CONTRACTOR SHALL ALSO REMOVE ALL TRASH AFTER COMPLETION OF WORK. WORK DONE UNDER THIS CONTRACT SHALL BE ACCOMPLISHED WITH MINIMUM IMPACT ON THE OPERATION OF THE BUILDING AND IT'S TENANTS.

23. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE ON EITHER THE INTERIOR OR THE EXTERIOR.

24. PROVIDE BUTTONS, TABS OR MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT CONCEALED ABOVE REMOVAL CEILING TILES.

25. THE CONTRACTOR SHALL FURNISHED A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF ACCEPTANCE BY OWNER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR. X

26. ALL SYSTEMS SHALL BE CLEAN OF FOREIGN MATERIAL AND ROUGH SPOTS PRIOR TO BEING PLACED IN SERVICE AND BEFORE OPERATIONAL TESTS ARE PERFORMED.

27. TEST, ADJUST AND BALANCE (TAB) EACH AND EVERY MECHANICAL SYSTEM USING CAPACITIES AS INDICATED ON THE PLANS AND SCHEDULES. AS A MINIMUM, PROVIDE REPORT NOTING QUANTITIES OF AIR AND/OR LIQUID FOR EACH TERMINAL AS WELL AS QUANTITIES, PRESSURE CHANGES AND TEMPERATURE DIFFERENTIALS THROUGH EACH UNIT ALONG WITH MOTOR OPERATING AMPS.

28. CONTRACTOR SHALL SUBMIT COPIES OF COMPLETE TAB REPORT TO THE OWNER/ARCHITECT FOR FINAL APPROVAL. BALANCE REPORT SHALL SHOW METHODS AND RESULTS OF PERFORMED TESTING AND BALANCING. CONTRACTOR SHALL BE 'AABC' AND 'NEBB' CERTIFIED. REPORT SHALL BE SUBMITTED IN TIME FOR REVIEW BEFORE APPLICATION FOR OCCUPANCY PERMIT.

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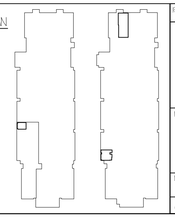
KEY PLAN
NTS



REV #: | DESCRIPTION: | REV DATE:

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24 MARWICK AVENUE
WALTHAM, MA 02452

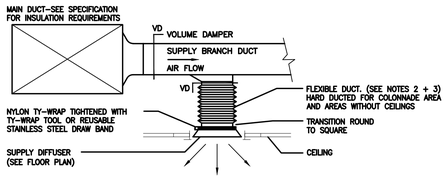
DRN BY: JBK/ KAZ
SCALE:
DATE: MAY 29, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING NUMBER: H0.01

DRAWING TITLE:
HVAC LEGEND, GENERAL NOTES & ABBREVIATIONS

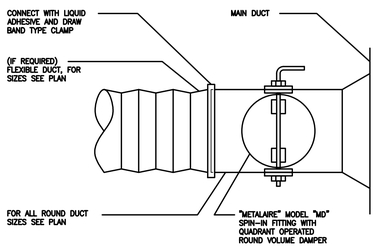
JOB #: 201209



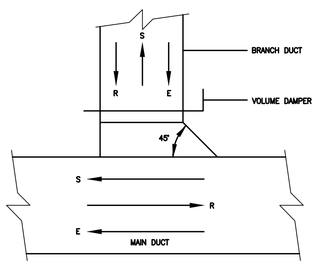
DUCT TAKE-OFF NOTES

1. OFFSETS WITH FLEX DUCT SHALL NOT EXCEED 30" AND SHALL BE GRADUAL. OFFSETS IN EXCESS OF 30" SHALL BE HARD-DUCTED.
2. FLEX DUCT SHALL NOT HAVE MORE THAN 1/2" SAG PER FOOT.
3. LENGTH OF FLEX DUCT SHALL NOT EXCEED 3'-0".
4. PROVIDE DUCT MOUNTED VOLUME DAMPER TO DIFFUSER AS CLOSE TO MAIN DUCT AS POSSIBLE.

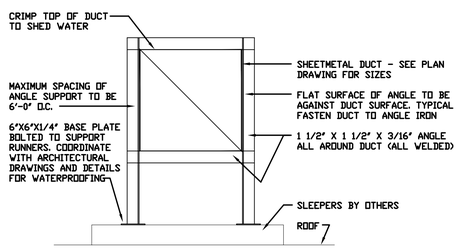
DIFFUSER CONNECTION DETAIL | NTS



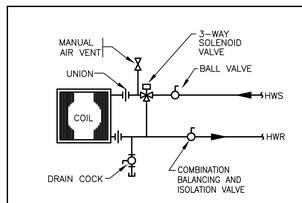
ROUND BRANCH DUCT TAKE-OFF DETAIL | NTS



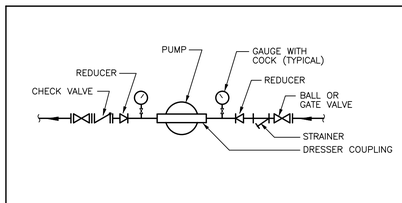
BRANCH DUCT CONNECTION DETAIL | NTS



DUCT ACROSS ROOF DETAIL | NTS



HEAT/COOL COIL PIPING DETAIL | N.T.S.

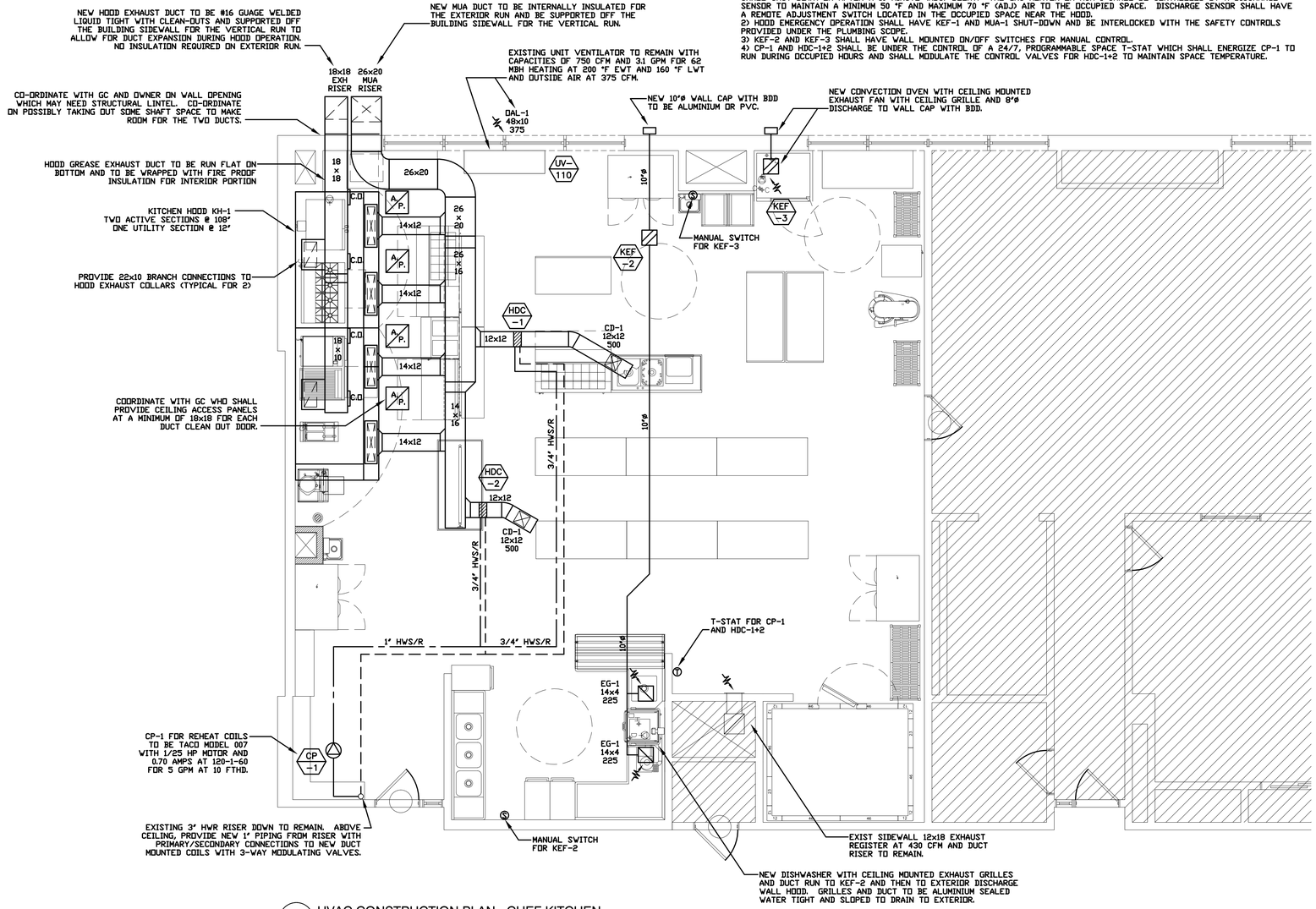


TYPICAL IN-LINE PUMP PIPING DETAIL | N.T.S.

NOTE: EXHAUST AND MUA DUCTS TO BE SUPPORTED OFF SIDE OF BUILDING AND SUPPORTS TO BE SECURED WITH BOLTS WITH EPOXY EMBEDMENT INTO BRICK/BLOCK WALL

SEQUENCES OF OPERATION:

1) HOOD NORMAL OPERATION SHALL BE BY MANUAL SWITCH WHICH SHALL ENERGIZE THE EXHAUST FAN, KEF-1, AND THE MAKE-UP AIR UNIT, MUA-1, TO RUN WHEN SWITCH IS IN THE ON POSITION. WHEN SWITCH IS MOVE TO OFF POSITION, KEF-1 AND MUA-1 SHALL SHUT DOWN ON AFTER A 10 MINUTE (ADJ) DELAY. THE GAS HEATER ON MUA-1 SHALL BE CONTROLLED BY A DISCHARGE SENSOR TO MAINTAIN A MINIMUM 50 °F AND MAXIMUM 70 °F (ADJ) AIR TO THE OCCUPIED SPACE. DISCHARGE SENSOR SHALL HAVE A REMOTE ADJUSTMENT SWITCH LOCATED IN THE OCCUPIED SPACE NEAR THE HOOD.
2) HOOD EMERGENCY OPERATION SHALL HAVE KEF-1 AND MUA-1 SHUT-DOWN AND BE INTERLOCKED WITH THE SAFETY CONTROLS PROVIDED UNDER THE PLUMBING SCOPE.
3) KEF-2 AND KEF-3 SHALL HAVE WALL MOUNTED ON/OFF SWITCHES FOR MANUAL CONTROL.
4) CP-1 AND HDC-1+2 SHALL BE UNDER THE CONTROL OF A 24/7, PROGRAMMABLE SPACE T-STAT WHICH SHALL ENERGIZE CP-1 TO RUN DURING OCCUPIED HOURS AND SHALL MODULATE THE CONTROL VALVES FOR HDC-1+2 TO MAINTAIN SPACE TEMPERATURE.



1 HVAC CONSTRUCTION PLAN - CHEF KITCHEN
1/4" = 1'-0"

E.D.E. INC.
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KEY PLAN NTS

REV #	DESCRIPTION	REV DATE

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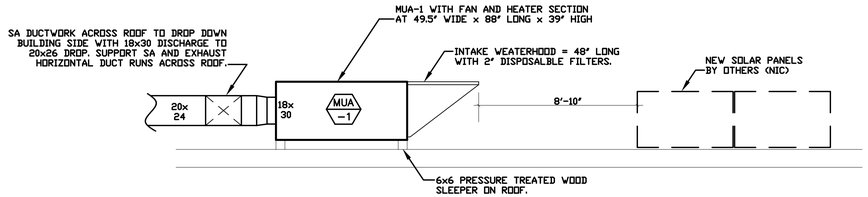
DRN BY:	JRK / KAZ
SCALE:	
DATE:	MAY 25, 2012
DRAWING NUMBER:	H1.01

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02492

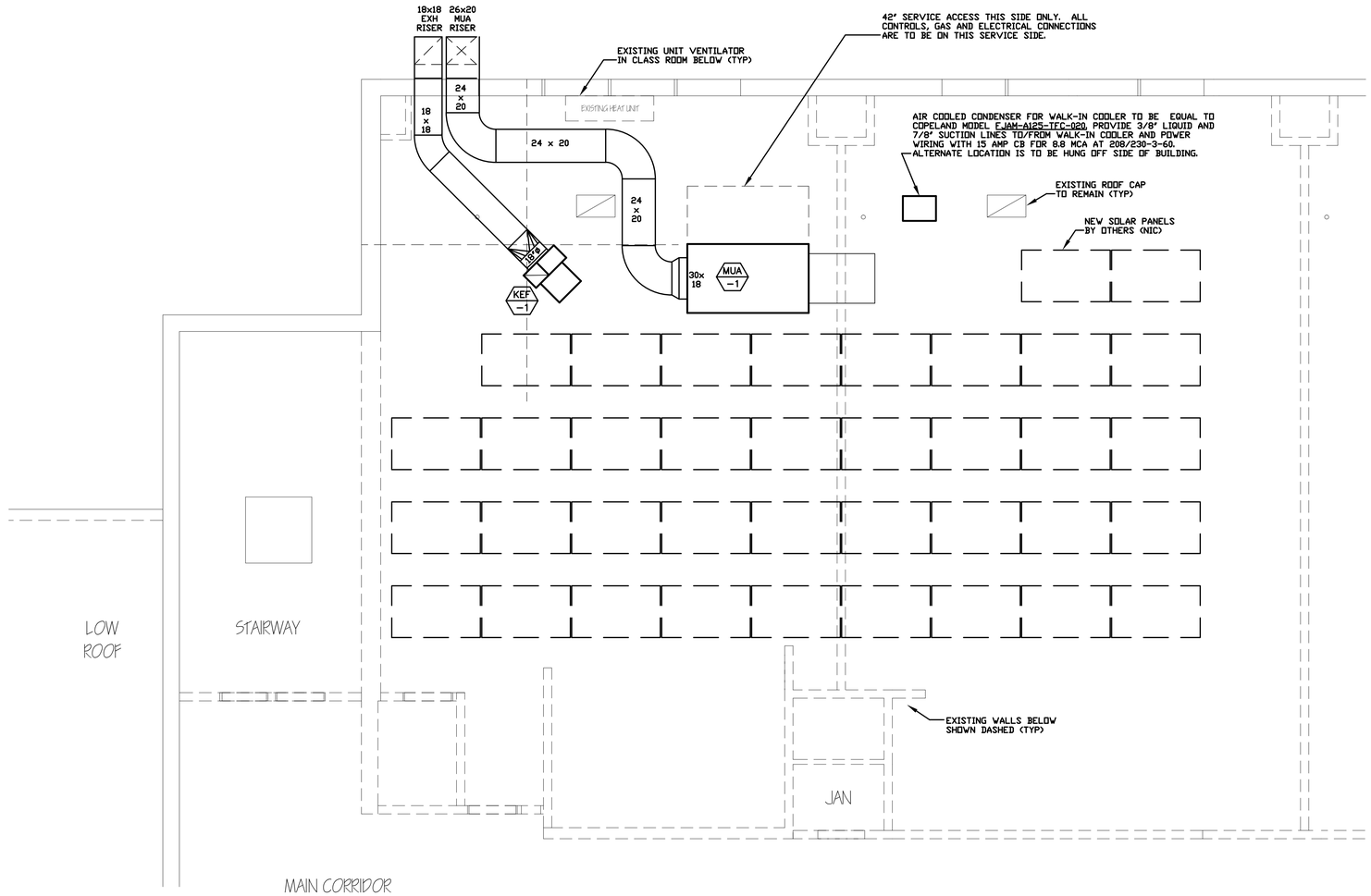
DRAWING TITLE:
HVAC 2nd Floor Plan & Details - CHEF'S KITCHEN

JOB #: 201209



2 MUA-1 ELEVATION
1/4" = 1'-0"

NOTES:
1) LOCATE KEF-1 AND MUA-1 AT LEAST 3'-0" IN FROM ANY ROOF EDGE TO ALLOW ADDING SAFETY RAILINGS.
2) COORDINATE WITH GC ON PROVIDING SLEEPERS AND SECURING TO ROOF FOR ALL NEW DUCTWORK AND EQUIPMENT.
3) AVOID DAMAGE TO EXISTING ROOF.
4) PROVIDE GUY WIRES FOR KEF-1 DISCHARGE STACK AND COORDINATE WITH GC ON ANCHORING WIRES.



1 HVAC ROOF PLAN - CHEF KITCHEN
1/4" = 1'-0"

MAKE-UP AIR UNIT SCHEDULE (MUA-)

MARK	SERVICE	CFM		TOTAL E.S.P.	FAN HP	GAS HEATING			ELECTRICAL				MODEL (GREENHECK)	NOTES
		SA	OA			INPUT	OUTPUT	EAT + RISE = LAT	V-PH-CY	MOTOR	MCA	CB		
MUA-1	KITCHEN HOOD	4500	4500	1.77	3.0	385	345	-10 + 63 = 73	208-3-60	10.6	14.0	20	DGK-115-H25-01	1+2+3

NOTES: 1) UNIT TO BE INTERLOCKED WITH ON/OFF SWITCH AT HOOD AND PROVIDED WITH LOCAL DISCONNECT FOR SERVICING. 2) PROVIDE WITH ELECTRONIC 2-TO-1 FURNACE CONTROL AND DISCHARGE TEMPERATURE CONTROL SET FOR 60 °F (ADJUSTABLE). 3) PROVIDE WITH DISPOSALABLE 30-30 FILTERS AT 2" THICK WITH SECOND SET TO BE PROVIDED AT TURN-OVER.

EXHAUST FAN SCHEDULE

MARK	MODEL	C.F.M.	S.P. (INCHES)	R.P.M.	DRIVE	HP/WATT	AMPS	V-PH-HZ	SERVING	MANUFACTURER	NOTES
KEF-1	SWB-216-30	4500	1.50	1947	BELT	3.0/-	10.6	208-3-60	KITCHEN HOOD	GREENHECK	1+2+3+4
KEF-2	FR-250	450	0.80	2850	DIR	-/240	2.4	120-1-60	DISHWASHER	FANTECH	5+6
KEF-3	6-CEV-030A	300	0.25	935	DIR	-/212	2.7	120-1-60	CONVECT OVEN	FANTECH	5+6

NOTES: 1) PROVIDE WITH PREMIUM EFFICIENCY MOTOR. 2) PROVIDE WITH UL/cUL 762 LISTING FOR RESTARAUNT EXH APPLIANCES. 3) PROVIDE WITH LOCAL DISCONNECT SWITCH FOR SERVING. 4) PROVIDE WITH INTERLOCK TO ON/OFF SWITCH AT HOOD. 5) PROVIDE WITH WALL MOUNTED ON/OFF SWITCH AND WITH VARIABLE SPEED CONTROLLER ABOVE CEILING AT FAN FOR BALANCING. 6) PROVIDE WITH WALL CAP.

GRILLES, DIFFUSERS & REGISTERS SCHEDULE

MARK	DIFFUSER/GRILLE TYPE	CFM	NECK SIZE	MANUFACTURER/MODEL	REMARKS
CD-1	CEILING DIFF. SUPPLY	SEE PLANS	SEE PLANS	TITUS/TDC	1+2
EG-1	CEILING EXHAUST GRILLE	SEE PLANS	SEE PLANS	TITUS/350FL	1+2

NOTES: 1) PROVIDE BORDER TO MATCH CEILING OR WALL LOCATION. 2) ALL DEVICES SHALL HAVE WHITE ANODIC ACRYLIC PAINT FINISH. 3) PROVIDE WITH VOLUME DAMPER.

PUMP SCHEDULE

MARK	SERVICE	GPM	F'HEAD	RPM	TYPE	MANU	MODEL	HP	FLA	V-PH-HZ	NOTES
CP-1	REHEAT COILS	5	10	3250	IN-LINE	TACO	007	1/25	0.70	120-1-60	1

NOTES: 1) INTERLOCK WITH HOOD AND MUA-1/KEF-1 OPERATION.

HOT WATER DUCT COIL SCHEDULE

MARK	SERVICE	LOCATION	CFM	OUTPUT (MBH)	SIZE W x H (IN.)	FACE VELCD. (FPM)	ROWS	FINS PER INCH	AIR DATA		WATER DATA			NOTES
									EAT/LAT (°F)	P.D. (IN.)	GPM	EWT/LWT (°F)	P.D. (F'HEAD)	
HDC-1	REHEAT	CLASS RM	500	11.5	12x12	500	1	10	55-76	0.06	2.3	140-130	1.2	1+2+3
HDC-2	REHEAT	CLASS RM	500	11.5	12x12	500	1	10	55-76	0.06	2.3	140-130	1.2	1+2+3

NOTES: 1) INTERLOCK WITH HOOD AND MUA-1/KEF-1 OPERATION. 2) PROVIDE EACH WITH A 3-WAY MODULATING ELECTRIC CONTROL VALVE. 3) PROVIDE ONE COMMON WALL MOUNTED T-STAT.

KICHEN HOOD SCHEDULE

MARK	MODEL (GREENHECK)	WALL OR ISLAND	FILTER TYPE	OVERALL SIZE (L x W x H)	BOTTOM MOUNTING	SECTIONS	UTILITY CAB (LxWxH)	BACKSPLASH (LxH)	INTEGRAL AIR SPACE	CFM TOTAL		MUA PLENUM	NOTES
										EXH	ESP		
KH-1	GHEV	WALL	ALUM BAFFLE	228x54x24	78" AFF	2@ 108"	54x12x24	228x78	3" REAR	4500	0.48	YES	1+2+3+4+5

SECTIONAL DATA

SECTION MARK	LENGTH	EXHAUST				FILTERS			MUA PLENUM						
		CFM	ESP	COLLAR	FPM	18x20	20x20	RATING	LxWxH	TYPE	COLLARS	CFM	FPM	SP	INSULATED
LEFT	108	2250	0.478	1@ 21x10	1543	3	3	600°F	120x12x18	BOTTOM+FRONT OUTLETS	2@ 30x6	2@ 900	720	0.250	NO
RIGHT	108	2250	0.478	1@ 21x10	1543	3	3	600°F	108x12x18	BOTTOM+FRONT OUTLETS	2@ 30x6	2@ 900	720	0.308	NO

NOTES: 1) MATERIAL TO BE 430 SS WHERE EXPOSED. 2) HOOD TO BE UL-710 LISTED W/O EXHAUST FIRE DAMPER. 3) PROVIDE WITH FACTORY MOUNTED, INTEGRAL 3" REAR AIR SPACE. 4) PROVIDE WITH 3 INCANDESCENT LIGHTS FIR EACH SECTION FOR MINIMAL 30 FOOT CANDLE LEVEL AT WORK SURFACE. 5) PROVIDE WITH FIRE SUPPRESSION SYSTEM EQUAL TO ANSUL R-102 WITH 6 GALLON TANK, 2" PIPING WITH SHUTOFF VALVE AND 7 DROPS.

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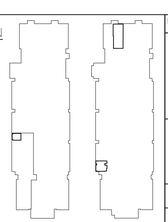
KEY PLAN
NTS



REV #.	DESCRIPTION:	REV DATE:

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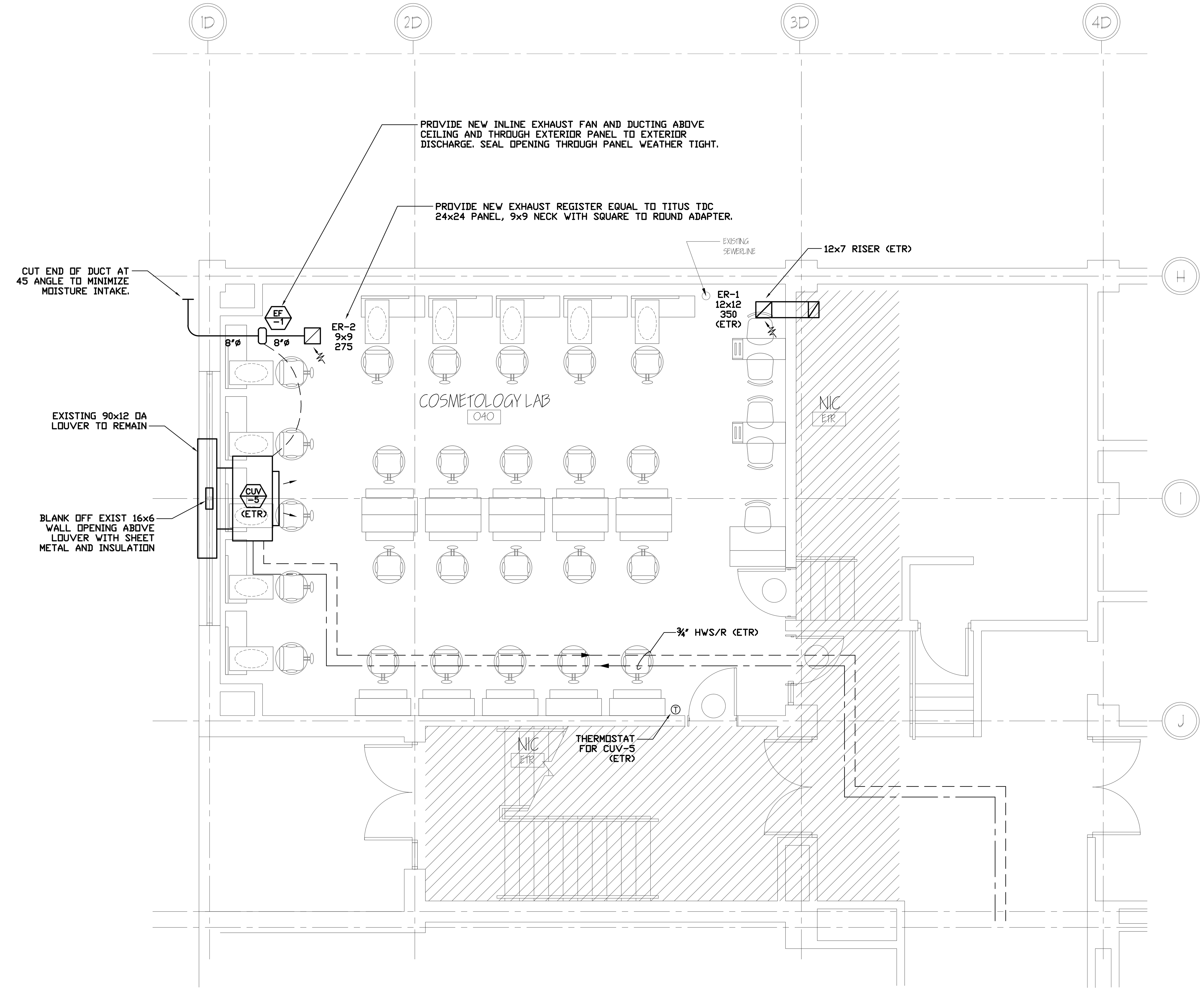
DRN BY: JRK/KAZ
SCALE:
DATE: MAY 25, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02492

DRAWING NUMBER: H1.02

DRAWING TITLE:
HVAC Roof Plan & Schedules - CHEF'S KITCHEN

JOB #: 20209



1 CONSTRUCTION PLAN - COSMETOLOGY
1/4" = 1'-0"

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ALTERNATE NO. 2 "HVAC AIR HANDLER, COSMETOLOGY LAB"

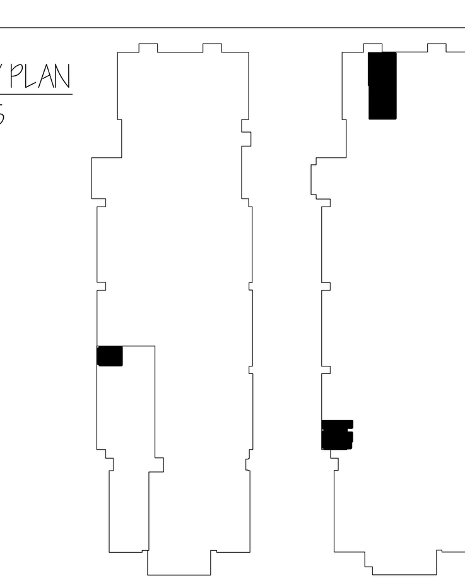
EXHAUST FAN SCHEDULE

MARK	MODEL (FANTECH)	C.F.M.	E.S.P.	R.P.M.	DRIVE	FAN MOTOR		AMPS MAX	V-PH-HZ	SERVING	MANUFACTURER	WEIGHT (LB)	NOTES
						HP	WATTS						
EF-1	FG-8	250	0.50	2550	DIR	-	119	1.14	120-1-60	COSMO LAB	FANTECH	10.0	1+2+3

NOTES: 1) FAN WITH EXHAUST DUCTING. 2) POWER WIRING BY ELECTRICAL CONTRACTOR. 3) ELECTRICAL TO INTERLOCK WITH UV

ALTERNATE NO. 2:
(HVAC FILED SUB-BIDDER) SHALL REMOVE EXISTING UNIT VENTILATOR COMPLETELY, PREPARE OPENING FOR NEW UNIT VENTILATOR, AND INSTALL NEW UNIT AS SPECIFIED ON H1.03.

KEY PLAN
NTS



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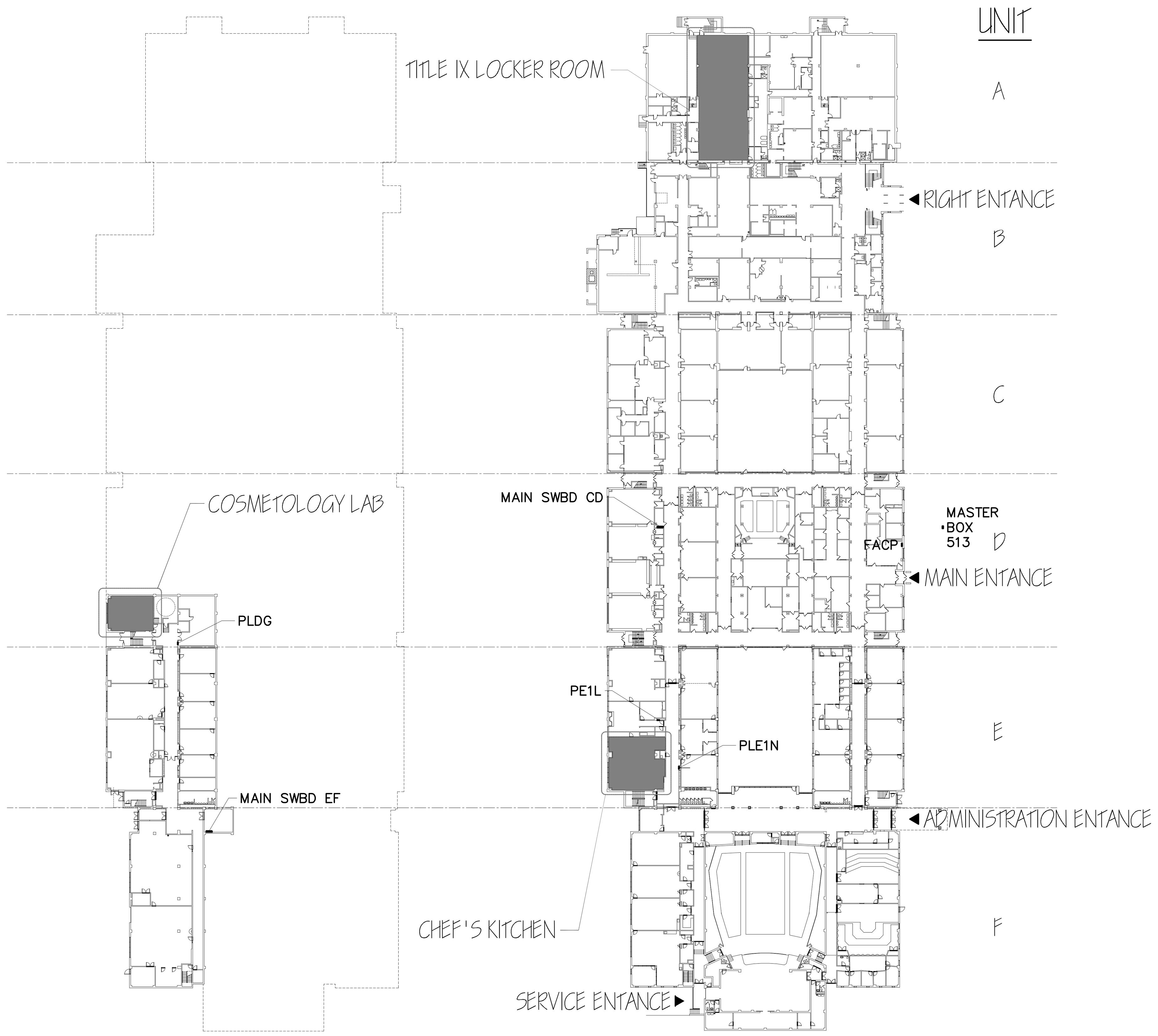
REV DATE:
DRN BY: EDE
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY LAB & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE: HVAC 1st FLOOR PLAN & SCHEDULES - COSMOTOLOGY LAB

DRAWING NUMBER: H1.03

JOB#: 201205



GROUND FLOOR

FIRST FLOOR

1 BUILDING KEYPLAN AND PANEL LOCATIONS
N.T.S.

LEGEND

- DUPLEX RECEPTACLE: COMMERCIAL SPECIFICATION GRADE, TAMPER RESISTANT U.L. LISTED 20A, 125VAC NEMA 5-20R HUBBELL BR20*TR OR EQUAL.
- GROUND FAULT DUPLEX RECEPTACLE: COMMERCIAL SPECIFICATION GRADE, TAMPER RESISTANT AND WEATHER RESISTANT U.L. LISTED 20A, 125VAC NEMA 5-20R HUBBELL GFTR20*U OR EQUAL.
- CEILING MOUNTED DUPLEX RECEPTACLE: COMMERCIAL SPECIFICATION GRADE, TAMPER RESISTANT U.L. LISTED 20A, 125VAC NEMA 5-20R HUBBELL BR20*TR OR EQUAL. EC TO PROVIDE SUBMITTAL TO ARCHITECT FOR APPROVAL.
- SINGLE RECEPTACLE: COMMERCIAL SPECIFICATION GRADE, U.L. LISTED 20A, 125VAC NEMA 5-20R HUBBELL HBL2162* OR EQUAL.
- L5-30R — SPECIFICATION GRADE RECEPTACLE, NEMA CONFIGURATION AS NOTED. -MICROWAVE OVEN (NEMA L5-30R)

RECEPTACLE NOTES:
"*" DENOTES MANUFACTURER COLOR CODE. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT HEIGHTS, LOCATIONS AND COLOR.
MOUNTING HEIGHTS:
- MOUNTED 18" AFF UNLUESS OTHERWISE NOTED.
- "44"" DENOTES RECEPT TO BE MOUNTED 44" ABOVE FINISHED FLOOR.
- "H" DENOTES RECEPT MOUNTED HIGH.
- "G" DENOTES FEED THROUGH FROM GFCI.
- "IG" DENOTES ISOLATED GROUND.
- "WP" DENOTES WEATHER PROOF. COORDINATE MOUNTING HEIGHT WITH ARCHITECT.

- TP — MANUAL MOTOR STARTER W/THERMAL PROTECTION AND PILOT LIGHT. MUST MEET L.O.T.O. CRITERIA. VERIFY THERMAL PROTECTION REQUIREMENTS IN THE FIELD. PROVIDE WP COVERPLATE AS REQUIRED.
- EF — MOTOR. EF DENOTES FRACTIONAL HP EXHAUST FAN. "O" DENOTES GARAGE DOOR OPENER. REFER TO SCHEDULE FOR MORE INFORMATION.
- NF 30AS — NONFUSED DISCONNECT SWITCH. NEMA ENCLOSURE TYPE AS REQUIRED.
- J — FLUSH MOUNTED JUNCTION BOX, SIZED PER NEC.
- J CM — SURFACE MOUNTED JUNCTION BOX, SIZED PER NEC. -"CM" DENOTES CEILING MOUNTED. -"F" DENOTES FAN BOX.
- SURFACE MOUNTED PANELBOARD (REFER TO ONE-LINE DIAGRAM FOR VOLTAGE)
- T — TRANSFORMER, KVA SIZE AS NOTED.
- CONDUIT RUN - TURN DOWN OR AWAY
- CONDUIT RUN - TURN UP OR TOWARD

- 2'X4' (4) LAMP FLUORESCENT FIXTURE, REFER TO LIGHTING SCHEDULE FOR MORE INFORMATION.
- 1'X4' (2) LAMP FLUORESCENT FIXTURE, REFER TO LIGHTING SCHEDULE FOR MORE INFORMATION.
- DOWN LIGHT, REFER TO LIGHTING SCHEDULE FOR MORE INFORMATION.

LIGHTING NOTES:
- "A" DENOTES FIXTURE TYPE.
- "a" DENOTES SWITCH CIRCUIT.
- SHADE DENOTES SELF CONTAINED ELECTRONIC BALLAST.

- EXIT SIGN. MATCH BUILDING STANDARD.
- EMERGENCY BATTERY UNIT. REFER TO LIGHTING SCHEDULE FOR MORE INFORMATION.
- WALL MOUNTED SINGLE POLE LIGHT SWITCH. SPECIFICATION GRADE SINGLE POLE TOGGLE SWITCH 20A, 120/277VAC HUBBELL 1221 OR EQUAL.

SWITCH NOTES:
-"a, b, c" DENOTES SWITCH CIRCUIT DESIGNATION
-"O" DENOTES AN OCCUPANCY SENSOR TYPE "SENSOR SWITCH MODEL WSD-2P-P-W" OR APPROVED EQUAL. VOLTAGE RATING AS REQUIRED.
-"3" DENOTES SPECIFICATION GRADE THREE - WAY TOGGLE SWITCH 20A. 120/277VAC HUBBELL 1223 OR EQUAL.
-"4" DENOTES SPECIFICATION FOUR - WAY TOGGLE SWITCH 20A, 120/277VAC HUBBELL 1224 OR EQUAL.
-"D" DENOTES DIMMER.
-"G" DENOTES GARBAGE DISPOSAL SWITCH.
-"F" DENOTES VARIABLE SPEED FAN SWITCH.

- RELOCATED DEVICE.
- ST — SHUNT TRIP.

- F — PULL STATION.
- ADA A/V APPLIANCE: -"S" DENOTES STROBE ONLY. -"C" DENOTES CEILING MOUNTED.
- SMOKE DETECTOR.
- CO — CARBON MONOXIDE DETECTOR.
- MS — METHANE DETECTOR.
- HEAT DETECTOR.
- PS — PRESSURE SWITCH.
- RI — REMOTE INDICATOR.
- BEACON.
- AIM — ADDRESSABLE INPUT MODULE.
- ANN — FIRE ALARM ANNUNCIATOR.
- FACP — FIRE ALARM CONTROL PANEL.
- ST — SHUNT TRIP PUSH BUTTON.
- R — RESET PUSH BUTTON.
- I — INTERCOM.
- S — WALL MOUNTED SPEAKER.
- C — CLOCK.
- W — W = FOR WALL MOUNTED TELEPHONE,
- 6 — TELEPHONE AND DATA OUTLET (6 DENOTES QUANTITY).

TEL/DATA NOTES:
PROVIDE 4" SQUARE BOX WITH SINGLE GANG EXTENSION RING AND 3/4" CONDUIT WITH PULL STRING. TERMINATE CONDUIT ABOVE WALL WITH 90° BEND. CABLING BY OTHERS.

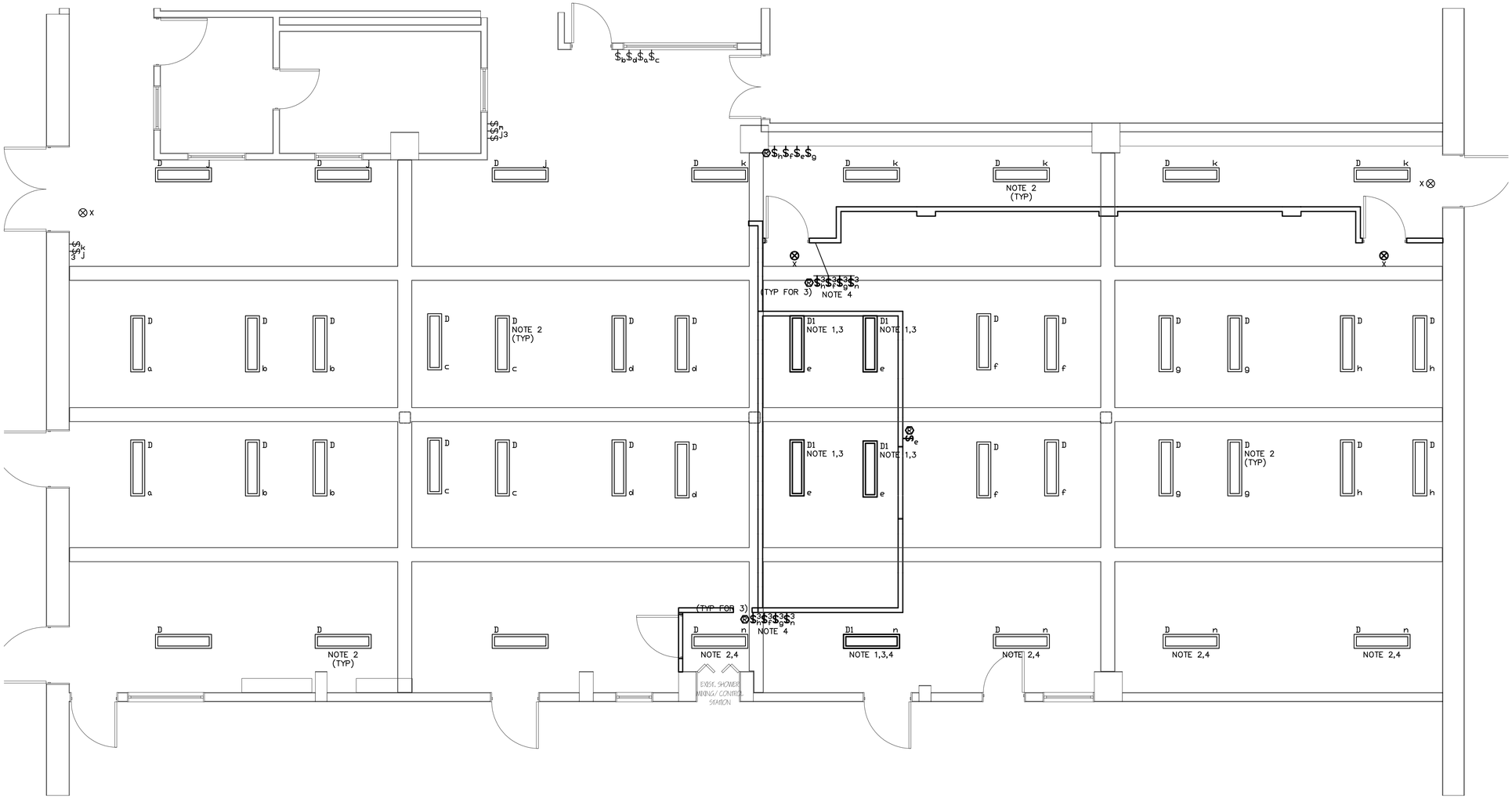
SUMMARY OF ALTERNATES:

A PROVIDE A/V RACEWAY FOR OVERHEAD PROJECTOR.

CIRCUIT DESIGNATION KEY:

K-20
- CIRCUIT NUMBER
- PANEL NAME: K = PE1K, L = PE1L

REV#:	DESCRIPTION:	REV DATE:
	JFF DESIGN ARCHITECTS & PLANNERS VC.781-899-6908 FAX 781-899-3050 EMAIL: ARCHITECTS@JFFDESIGN.COM 24 WARWICK AVENUE WALTHAM, MA 02452	DRN BY: GW SCALE: AS NOTED DATE: MAY 30, 2012
PROJECT:	WALTHAM HIGH SCHOOL CHEF'S KITCHEN, COSMETOLOGY, & TITLE IX LOCKER ROOM 617 LEXINGTON STREET WALTHAM, MA 02452	DRAWING NUMBER: E0.01
DRAWING TITLE:	ELECTRICAL LEGEND, BUILDING KEYPLAN, AND PANEL LOCATIONS	
		JOB#: 201205



1 NEW LIGHTING PARTIAL PLAN - TITLE IX LOCKER ROOM
1/ 4"=1'-0"

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG NO.	LAMPS	VOLTAGE	REMARKS
D	--	--	--	120	EXISTING FIXTURE.
D1	COOPER	FWS-232-UNV-EB81	(2) 32W T8	120	4' (2) LAMP WET LOCATION SURFACE MOUNTED INDUSTRIAL STRIP.

DRAWING NOTES:

EXISTING
DEMOLISH
NEW

DRAWING NOTES:

NOTE 1 REMOVE EXISTING LIGHT FIXTURES THROUGHOUT AND RETURN TO OWNER.

NOTE 2 CLEAN AND RELAMP FIXTURES AS REQUIRED UPON COMPLETION OF PROJECT.

NOTE 3 PROVIDE NEW (2) F28T8 LAMP FLUORESCENT RATED FOR WET LOCATIONS. PROVIDE NEW JUNCTION BOXES AND WIRING AS REQUIRED.

NOTE 4 PROVIDE NEW SWITCH CIRCUITING AS INDICATED.

KEY PLAN
NTS

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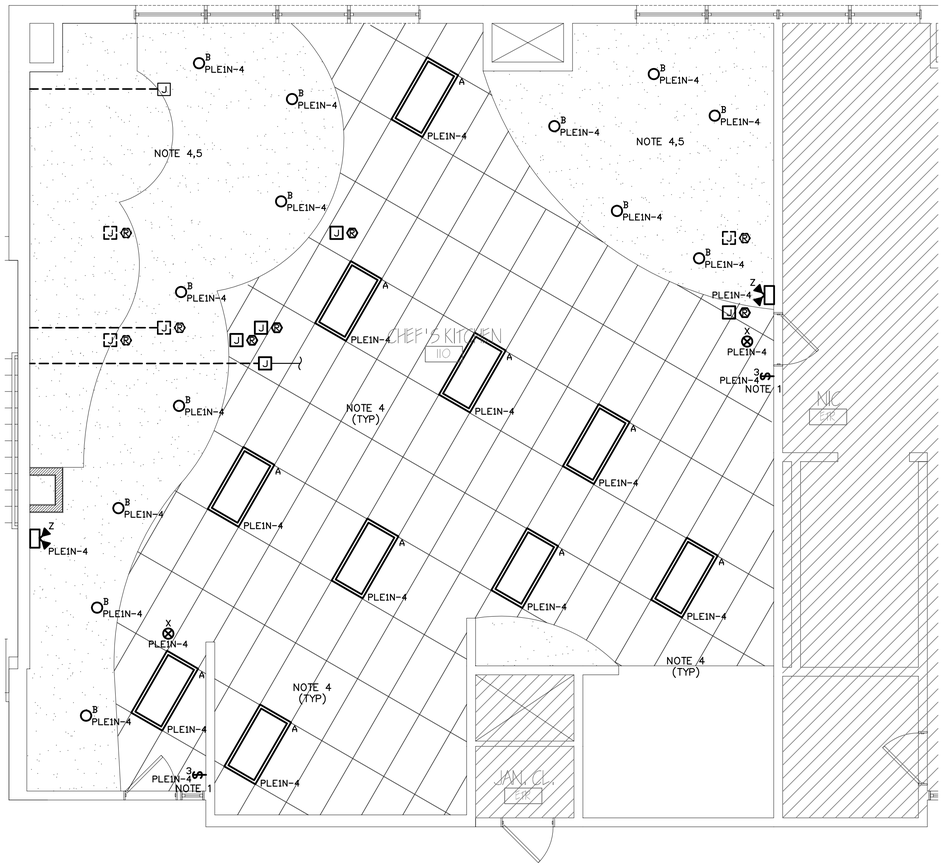
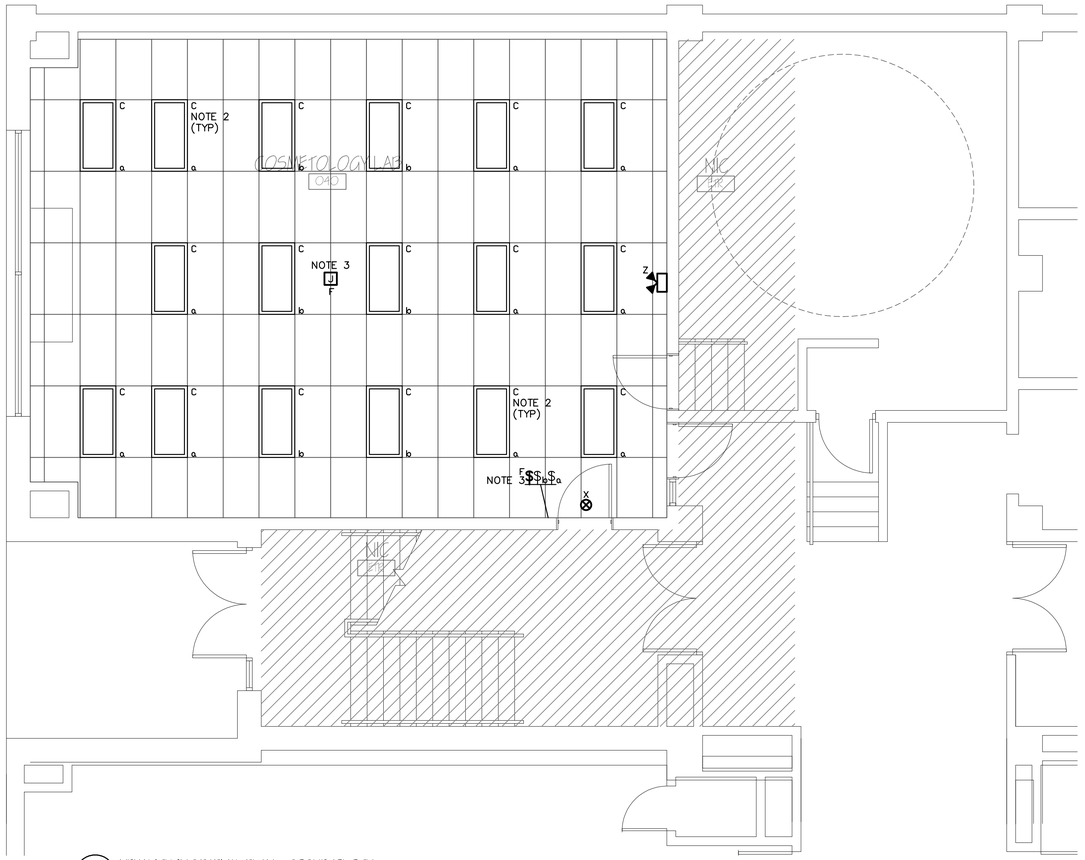
REV #: DESCRIPTION: REV DATE:
DRAWN: GW
SCALE: AS NOTED
DATE: MAY 30, 2012
PROJECT: WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY, & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452
DRAWING NUMBER: E2.01
DRAWING TITLE: NEW LIGHTING PARTIAL PLAN - TITLE IX LOCKER ROOM
JOB #: 201205



1 NEW LIGHTING AND ABOVE CEILING POWER PARTIAL PLAN - CHEF
1/4"=1'-0"



2 NEW LIGHTING PARTIAL PLAN - COSMETOLOGY
1/4"=1'-0"

DRAWING NOTES:

NOTE 1 REMOVE EXISTING LIGHT SWITCHES AND PROVIDE NEW THREE WAY SWITCHES AS INDICATED.

NOTE 2 PROVIDE SUPPORTS FOR STRUCTURAL CEILING AS REQUIRED. CLEAN AND RELAMP ALL FIXTURES AT COMPLETION OF PROJECT.

NOTE 3 REMOVE EXISTING CEILING FAN AND PROVIDE NEW CONTROLLED BY NEW VARIABLE SPEED SWITCH. PROVIDE NEW FAN BOX AND SUPPORT RATED FOR NEW FAN.

NOTE 4 DEMOLISH LIGHTING FIXTURES AS REQUIRED AND RETURN TO BUILDING OWNER. NOT ALL DEVICES REQUIRING DEMOLITION ARE SHOWN. WIRING NO LONGER REQUIRED SHALL BE REMOVED BACK TO POWER SOURCE. TRACE AND IDENTIFY BRANCH CIRCUIT OF ANY DEVICE TO REMAIN.

NOTE 5 RELOCATE JUNCTION BOXES AS REQUIRED SUCH THAT THEY ARE ACCESSIBLE FROM DROP CEILING.

LIGHTING FIXTURE SCHEDULE

DESIG	MANUFACTURER	CATALOG NUMBER	MTG	VOLT	LAMP		REMARKS
					QTY	DESCRIPTION	
A	LITE-TECH	LACH-24G-332-I9-3GSKT	R	120	3	32W T8	2' x 4' W/ TRIPLE GASKET
B	LUM-TECH	FH-VA6142-E / FT-V622	R	120	1	42W CFL	6" DOWNLIGHT W/ GASKETED LENS
Z	BEGHELLI	XLP-S2	W	120	-	INCLUDED	EMERGENCY BATTERY UNIT

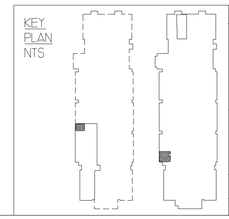
MOUNTING KEY:
"P" - PENDANT MOUNTED "S" - SURFACE MOUNTED "W" - WALL MOUNTED
"R" - RECESSED MOUNTED "U" - UNIVERSAL MOUNTED

NOTE:
BALLASTS SHALL BE LOW THD ELECTRONIC MANUFACTURED BY ADVANCE OR EQUAL. ALL LAMPS TO BE MANUFACTURED BY GENERAL ELECTRIC, PHILLIPS OR SYLVANIA AND BE COMPATIBLE WITH BALLAST.

DRAWING NOTES:

EXISTING
DEMOLISH
NEW

KEY PLAN NTS



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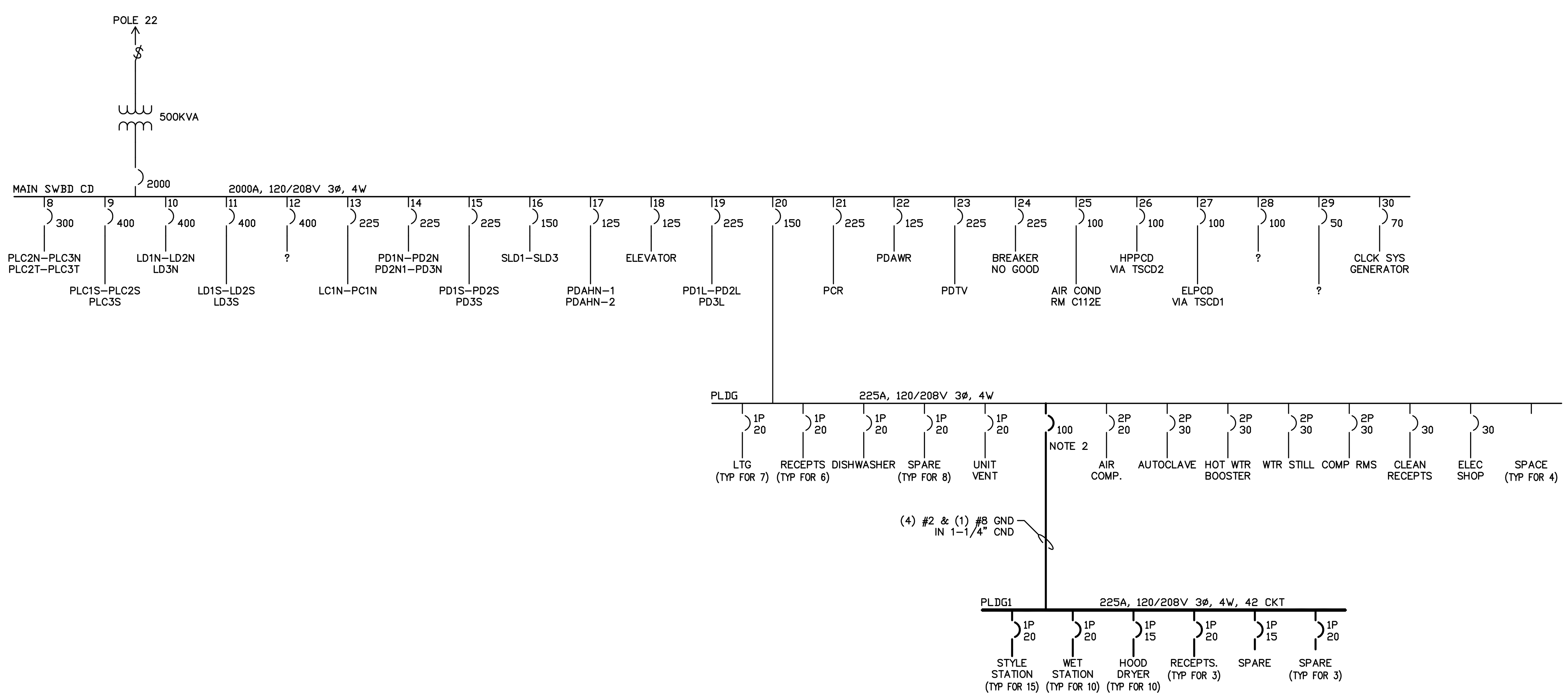
PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY, & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE:
NEW LIGHTING PARTIAL PLAN - CHEF'S KITCHEN & COSMETOLOGY

REV:
DATE:
DRAWN: GW
SCALE: AS NOTED
DATE: MAY 30, 2012
DRAWING NUMBER: E2.02
JOB#: 201205

1 CHEF'S KITCHEN NEW SIMPLIFIED ONE-LINE DIAGRAM
NONE



2 COSMOTOLOGY NEW SIMPLIFIED ONE-LINE DIAGRAM
NONE

DRAWING NOTES:

NOTE 1 PROVIDE ONE MECHANICALLY HELD CONTACTOR FOR EACH PANEL TO DE-ENERGIZE ALL EQUIPMENT INDICATED UPON HOOD SUPPRESSION SYSTEM OR EPO ACTIVATION. PROVIDE CONTACTOR WITH (2) ADDITIONAL 30A SPARE CONTACTS, ENCLOSURE, AND RESET PUSH BUTTON.

NOTE 2 REMOVE EXISTING 30A CIRCUIT BREAKER FOR HEATER AND PROVIDE NEW 100A CIRCUIT BREAKER WITH HARDWARE AND FILLER PLATES AS REQUIRED.

NOTE 3 REMOVE (3) EXISTING 20A, 1P CIRCUIT BREAKERS FOR ROOM E110 RECEPTACLES (CIRCUIT NUMBERS 20, 22, 24) AND PROVIDE NEW 100A, 3P CIRCUIT BREAKER WITH HARDWARE AND FILLER PLATES AS REQUIRED.

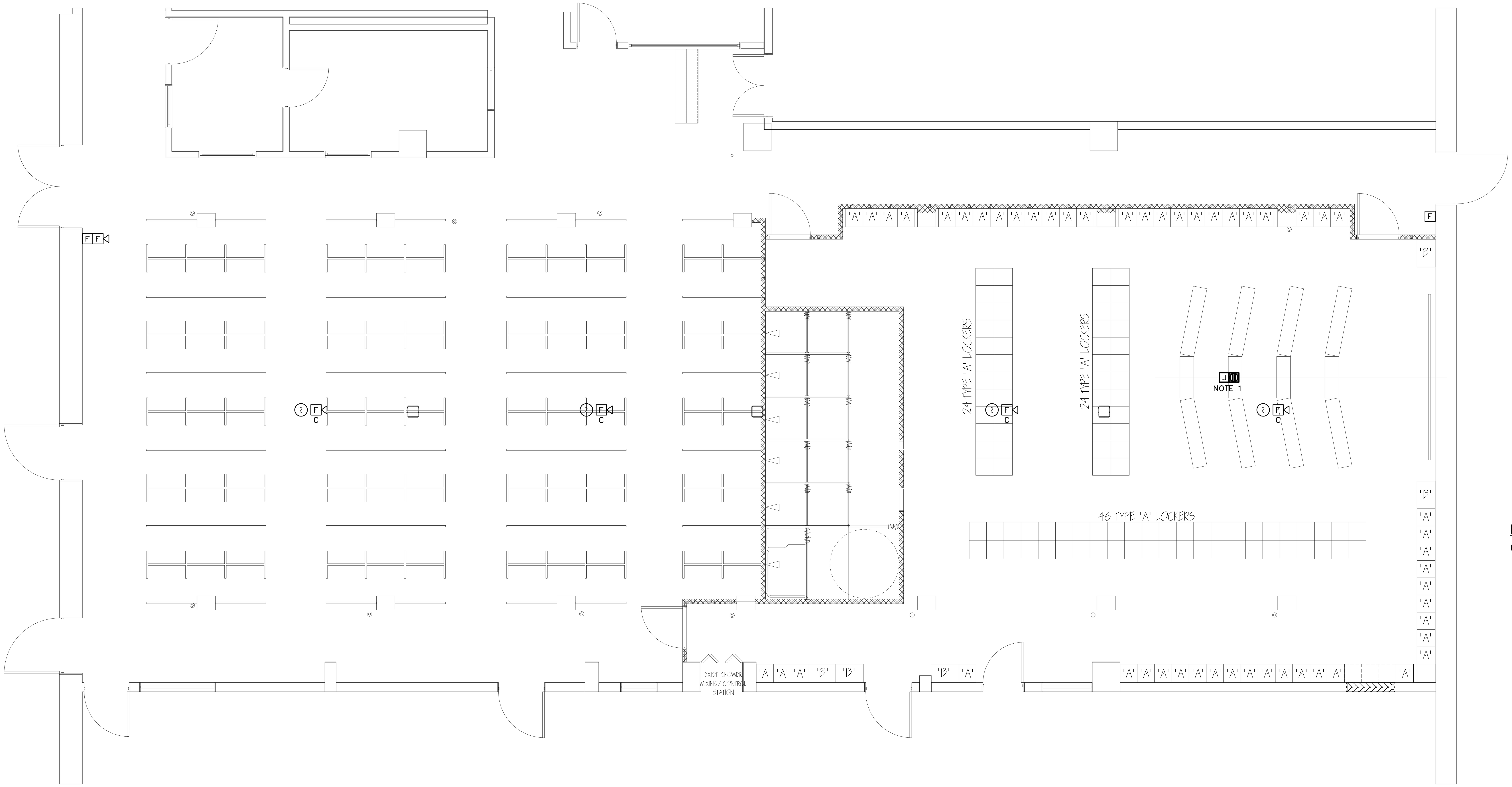
NOTE 4 REMOVE (2) EXISTING 70A, 2P CIRCUIT BREAKERS FOR ELECTRIC RANGES IN ROOM E110 AND PROVIDE NEW 90A, 3P CIRCUIT BREAKER WITH HARDWARE AND FILLER PLATES AS REQUIRED.

NOTE 5 SHUNT TRIP TO OPERATE FOR HOOD SUPPRESSION SYSTEM OR EPO ACTIVATION. REFER TO POWER PLAN ON E5.01 FOR MORE INFORMATION.

DRAWING NOTES:

———— EXISTING
———— NEW

REV#:	DESCRIPTION:	REV DATE:
	JFF DESIGN ARCHITECTS & PLANNERS	DRN BY: GW
		SCALE: AS NOTED
		DATE: MAY 30, 2012
PROJECT:	WALTHAM HIGH SCHOOL CHEF'S KITCHEN, COSMETOLOGY, & TITLE IX LOCKER ROOM 617 LEXINGTON STREET WALTHAM, MA 02452	DRAWING NUMBER: E4.01
DRAWING TITLE:	NEW ELECTRICAL ONE-LINE DIAGRAMS	JOB#: 201205



1 NEW POWER PARTIAL PLAN - TITLE IX LOCKER ROOM
1/4"=1'-0"

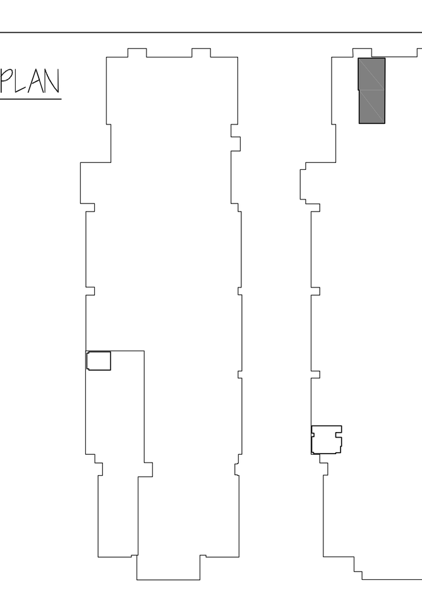
DRAWING NOTES:

NOTE 1 PROVIDE RECEPTACLE AND BRANCH CIRCUIT FOR NEW CEILING MOUNTED PROJECTOR. AS ALTERNATE A, ALSO PROVIDE JUNCTION BOX AND CONDUIT FROM A/V CLOSET FOR CONNECTION BY OTHERS.

DRAWING NOTES:

EXISTING
NEW

KEY PLAN
NTS



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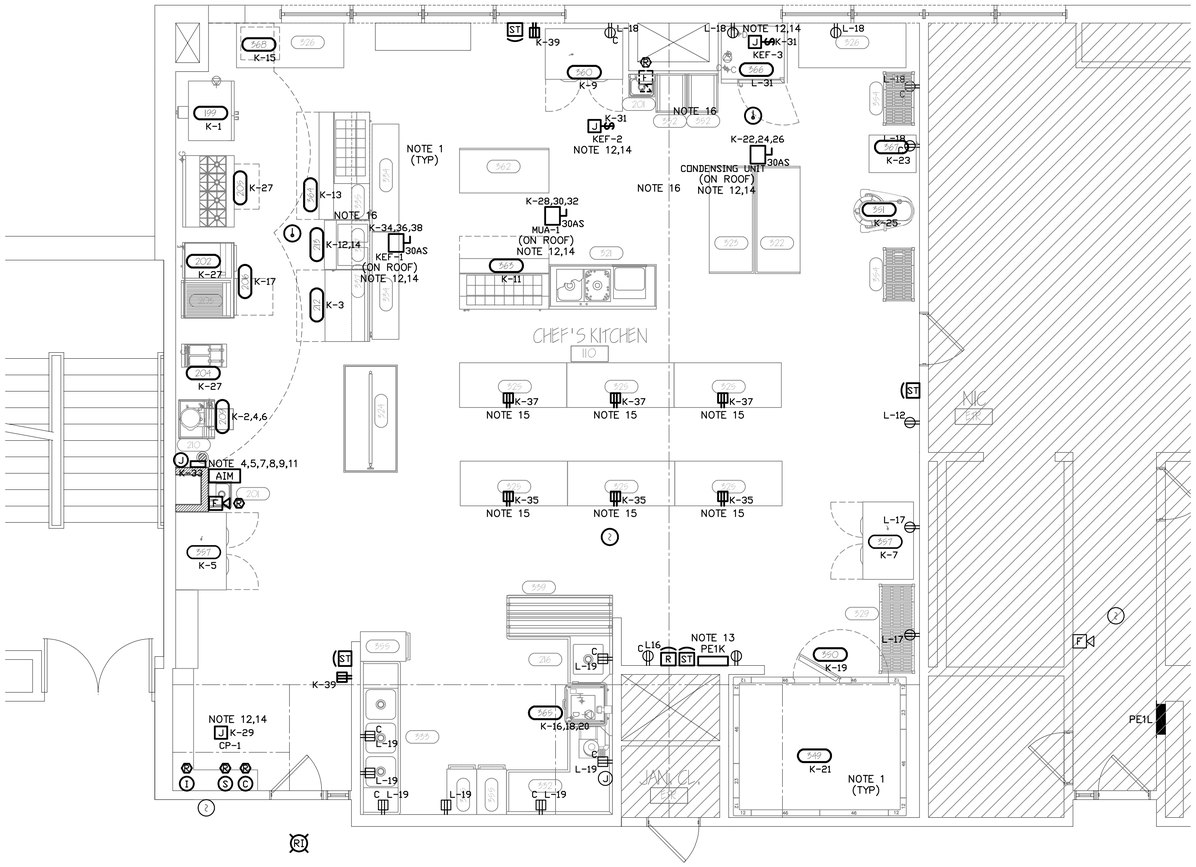
DRN BY: GW
SCALE: AS NOTED
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY, & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING NUMBER: E5.01

DRAWING TITLE: NEW PARTIAL POWER PLAN - TITLE IX LOCKER ROOM

JOB #: 201205

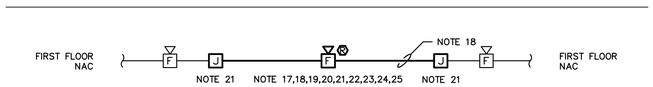


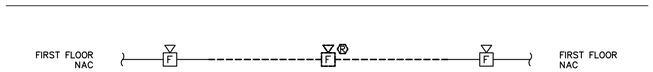
1 NEW POWER PARTIAL PLAN - CHEF'S KITCHEN
1/4"=1'-0"

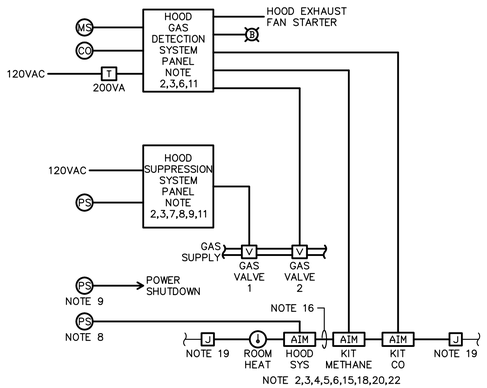
CHEF'S KITCHEN EQUIPMENT LEGEND

197 K-8,10	MICROWAVE OVEN	PROVIDE L6-30R RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
197 K-1	CONVECTION OVEN	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
202 K-17	GAS GRIDDLE	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
203 K-27	FRYER	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
205 K-27	RANGE	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
206 K-17	REFRIGERATOR	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
209 K-2,4,6	KETTLE	PROVIDE L15-30R RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
212 K-3	UNDERCOUNTER FREEZER	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
214 K-12,14	HOT FOOD TABLE	PROVIDE L6-15R RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
548 K-21	WALK-IN REFRIGERATOR	PROVIDE MOTOR SAFETY SWITCH, FLEX CONNECTION, AND BRANCH CIRCUIT AS INDICATED TO EVAPORATOR COIL.
590 K-19	WALK-IN DOOR	PROVIDE BRANCH CIRCUIT AND CONNECTION TO FACTORY PRE-WIRED HEATER CABLE.
591 K-25 K-5	FLOOR MIXER (EXISTING)	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
597 K-7	REACH-IN FREEZER	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED (TYPICAL FOR 2).
560 K-9	REACH-IN REFRIGERATOR	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
567 K-11	SANDWICH REFRIGERATOR	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
564 K-13	SANDWICH UNIT	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
569 K-16,18,20	DISHWASHER	PROVIDE DISCONNECT, BRANCH CIRCUIT AS INDICATED, AND CONNECTION TO DISHWASHER.
566 L-31	ELECTRIC OVEN	PROVIDE DISCONNECT, BRANCH CIRCUIT AS INDICATED, AND CONNECTION TO ELECTRIC OVEN.
567 K-23	PROOFING BOX (EXISTING)	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.
568 K-15	DELI SLICER (FUTURE)	PROVIDE RECEPTACLE AND BRANCH CIRCUIT AS INDICATED.

COORDINATE LOCATION OF ALL EQUIPMENT WITH ARCHITECTURAL DRAWINGS AND OTHER TRADES. VERIFY EQUIPMENT CONNECTION IN THE FIELD BEFORE INSTALLATION.







2 FIRE ALARM SYSTEM MODIFICATION DIAGRAMS
NONE

DRAWING NOTES:

NOTE 1 DEMOLISH DEVICES AND WIRING AS REQUIRED AND REMOVE WIRING BACK TO POWER SOURCE. PROVIDE BLANK COVER PLATES AS REQUIRED. TRACE AND IDENTIFY BRANCH CIRCUIT OF ANY DEVICE TO REMAIN.

NOTE 2 FIRE ALARM SYSTEM AND INSTALLATION SHALL COMPLY WITH APPLICABLE REGULATIONS OF NFPA BULLETIN #72, LIFE SAFETY CODE #101, MASSACHUSETTS ELECTRIC CODE, AND WALTHAM FIRE DEPARTMENT.

NOTE 3 SYSTEM MANUFACTURER SHALL PROVIDE INSTALLATION WIRING DIAGRAM OF THE FIRE ALARM ALARM SYSTEM, AND VERIFICATION CERTIFICATE OF SYSTEM OPERATING PRIOR TO FINAL ACCEPTANCE.

NOTE 4 ACTIVATION OF METHANE DETECTOR, CARBON MONOXIDE DETECTOR, OR HOOD SUPPRESSION SYSTEM SHALL INITIATE AN ALARM CONDITION AND ITS LOCATION SHALL BE INDICATED AT FACP AND REMOTE ANNUNCIATOR.

NOTE 5 PROVIDE ADDRESSABLE INPUT MODULE FOR KITCHEN EQUIPMENT AS INDICATED AND PROVIDE NAMEPLATE INDICATING DEVICE MONITORED.

NOTE 6 GAS DETECTION SYSTEM PANEL AND RELATED EQUIPMENT FURNISHED BY PLUMBING CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR.

NOTE 7 HOOD SUPPRESSION SYSTEM (BY OTHERS).

NOTE 8 CONNECT HOOD FIRE SUPPRESSION SYSTEM ALARM CONTACTS OR PRESSURE SWITCH TO EXISTING INITIATING DEVICE CIRCUIT IN FACP.

NOTE 9 PROVIDE INTERFACE SIGNAL TO OPERATE CONTACTOR TO SHUTDOWN ALL ELECTRICAL EQUIPMENT AND CLOSE GAS VALVE UPON HOOD SUPPRESSION SYSTEM ACTIVATION.

NOTE 10 ELECTRICAL CONTRACTOR SHALL REPLACE ANY RECEPTACLES WITHIN 6' OF SINKS WITH NEW GFCI RECEPTACLES.

NOTE 11 PROVIDE JUNCTION BOX AND BRANCH CIRCUIT AS INDICATED, ALL WIRING AND CONNECTION BY ELECTRICAL CONTRACTOR. REFER TO PLUMBING DRAWINGS FOR MORE INFORMATION.

NOTE 12 REMOTE CONDENSING UNIT IS TO BE LOCATED ON THE ROOF. EXACT LOCATION TO BE DETERMINED IN THE FIELD WITH ARCHITECT. ALSO PROVIDE SERVICE GFCI RECEPTACLE AND LIGHT AT CONDENSER LOCATION.

NOTE 13 PROVIDE NEW 100A, 120/208V, 3ø, 4W, 25KAIC, 42 CIRCUIT PANEL WITH GROUNDING BUS, DOOR-IN-DOOR TRIM, AND 100A MAIN BREAKER. PROVIDE (2) 15A, 1P, (21) 20A, 1P, (2) 30A, 2P, (2) 15A, 3P, (1) 20A, 3P, AND (2) 30A, 3P BREAKERS. REFER TO ELECTRICAL ONE-LINE DIAGRAM ON E4.01 FOR MORE INFORMATION.

NOTE 14 COORDINATE LOCATION OF HVAC EQUIPMENT WITH MECHANICAL CONTRACTOR AND ROUTING OF FEEDERS WITH ARCHITECT. REFER TO MECHANICAL DRAWINGS FOR MORE INFORMATION.

NOTE 15 RECEPTACLE SECURED TO UNDERSIDE OR PREP TABLE.

NOTE 16 DEMOLISH IN-FLOOR WIRING BACK TO SOURCE. RACEWAY MAY BE REUSED FOR NEW WIRING.

NOTE 17 REFER TO THE FLOOR PLAN FOR THE LOCATION, TYPE AND NUMBER OF FIRE ALARM DEVICES TO BE PROVIDED.

NOTE 18 PROVIDE TWISTED PAIR FA CABLE WITH RED JACKET (CONDUCTOR COLOR CODE, SHIELD, AND SIZE TO MATCH EXISTING) FOR DEVICES AS REQUIRED. ALL WIRING SHALL BE CLASS "A" WIRING WITH TERMINALS FOR IN/OUT WIRING.

NOTE 19 FIRE ALARM SPEAKER/STROBE UNITS SHALL BE LOCATED AS INDICATED ON FLOOR PLAN. SPEAKERS SHALL UTILIZE A WATTAGE TAP POSITION. PROVIDE AMPLE SOUND COVERAGE. ADJUST SPEAKER TAP SETTING AS REQUIRED AFTER PRELIMINARY SYSTEM TEST TO PROVIDE AMPLE SOUND COVERAGE.

NOTE 20 PROVIDE NEW DEVICES TO MATCH BUILDING STANDARDS AND TIE INTO EXISTING FIRE ALARM SYSTEM. UPON COMPLETION OF WORK DEVICES SHALL BE PROGRAMMED AND TESTED FOR A COMPLETE OPERATIONAL SYSTEM.

NOTE 21 PROVIDE JUNCTION BOXES AND INTERCEPT NOTIFICATION CIRCUIT FOR RELOCATED APPLIANCE. PROVIDE NEW LABEL ON JUNCTION BOXES INDICATING CIRCUIT AND TO/FROM DEVICE DESIGNATION.

NOTE 22 VERIFY BATTERY CAPACITY OF EXISTING SYSTEM AND UPGRADE AS REQUIRED TO PROVIDE BATTERY CAPACITY FOR 15 MINUTES OF ALARM ACTIVATION AFTER 60 HOURS OF STANDBY.

NOTE 23 ALL FIRE ALARM INDICATING APPLIANCES SHALL BE MOUNTED AT 80" A.F.F. UNLESS OTHERWISE REQUIRED AND COORDINATED WITH THE ARCHITECT OR ENGINEER.

NOTE 24 SYSTEM SHALL MEET ALL "ADA" REQUIREMENTS.

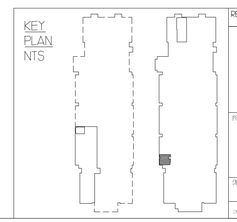
NOTE 25 ELECTRICAL CONTRACTOR SHALL INCLUDE IN ITS SCOPE OF WORK ALL PROGRAMMING AND TESTING OF ALL NEW AND/OR AFFECTED FIRE ALARM DEVICES. COORDINATE AND SCHEDULE ALL WORK WITH BUILDING OWNER AND FIRE ALARM COMPANY OF RECORD.

DRAWING NOTES:

EXISTING

NEW

KEY PLAN NTS



REV# | DESCRIPTION | REV DATE

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DRWN: GW

SCALE: AS NOTED

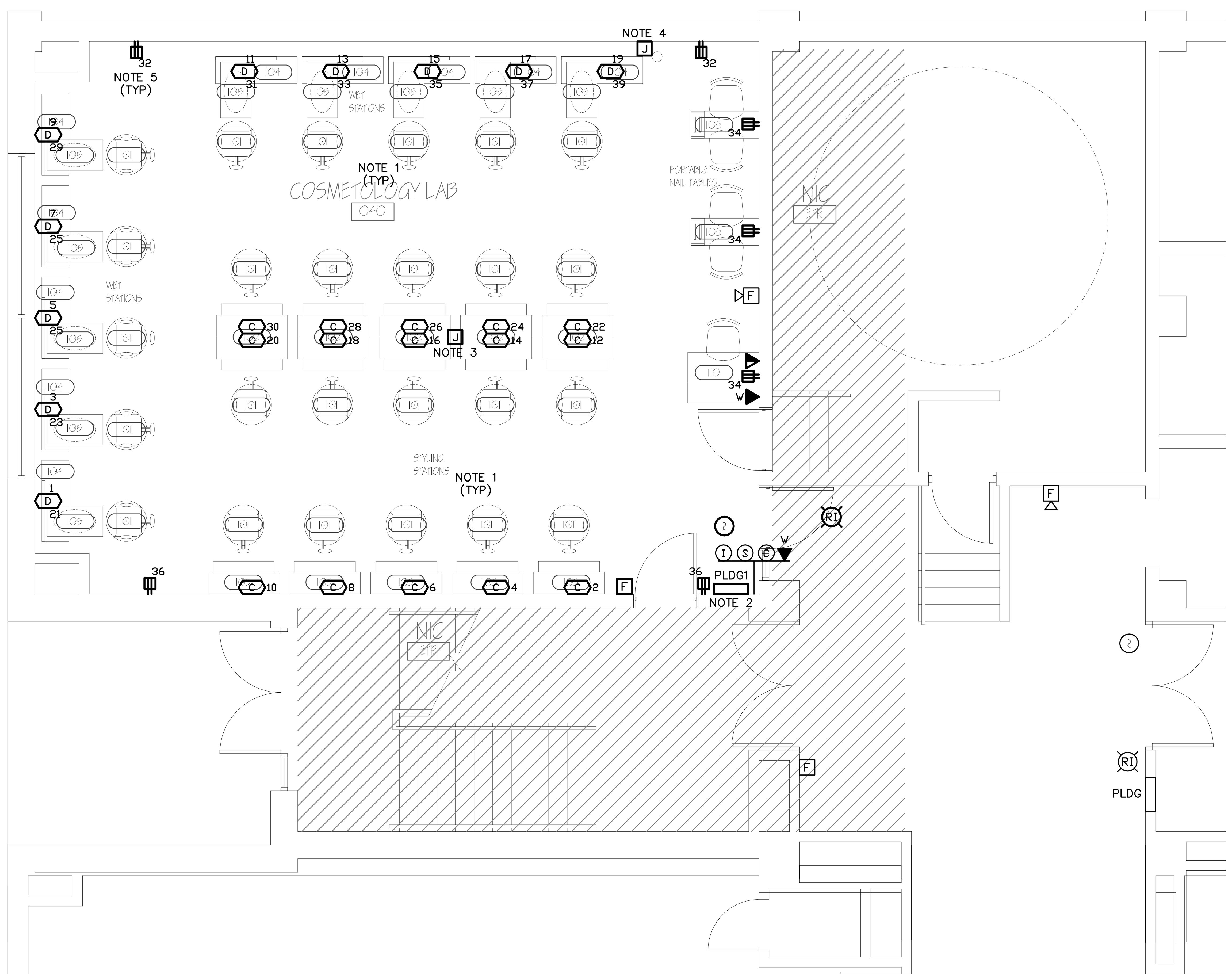
DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY, & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE:
NEW PARTIAL POWER PLAN - CHEF'S KITCHEN

DRAWING NUMBER: E5.02

JOB#: 20120S



1 NEW POWER PARITAL PLAN - COSMETOLOGY
1/4"=1'-0"

COSMETOLOGY EQUIPMENT LEGEND

C 2	STYLE STATION	PROVIDE JUNCTION BOX AND BRANCH CIRCUIT AS INDICATED FOR STYLE STATION. –"2" DENOTES BRANCH CIRCUIT.
1 D 3	WET STATION & HOOD DRYER	PROVIDE JUNCTION BOX AND BRANCH CIRCUIT AS INDICATED FOR WET STATION AND HOOD DRYER. –"1" DENOTES BRANCH CIRCUIT FOR WET STATION. –"3" DENOTES BRANCH CIRCUIT FOR HOOD DRYER.
	GENERAL NOTE:	COORDINATE LOCATION OF ALL EQUIPMENT WITH ARCHITECTURAL DRAWINGS AND OTHER TRADES.

DRAWING NOTES:

NOTE 1 DEMOLISH DEVICES AS REQUIRED AND REMOVE WIRING BACK TO POWER SOURCE. TRACE AND IDENTIFY BRANCH CIRCUIT OF ANY DEVICE TO REMAIN.

NOTE 2 PROVIDE NEW 225A MAIN LUG, 120/208V, 3ø, 4W, 25KAIC, 42 CIRCUIT PANEL WITH GROUNDING BUS AND DOOR–IN–DOOR TRIM. PROVIDE (10) 15A, 1P, AND (32) 20A, 1P BREAKERS. PANEL TO BE SURFACE MOUNTED ON METAL CHANNEL WITHIN EXISTING CASEWORK CABINET. REFER TO ELECTRICAL ONE–LINE DIAGRAM ON E4.01 FOR MORE INFORMATION.

NOTE 3 PROVIDE JUNCTION BOX ABOVE CEILING WITH POWER POLE TO FLOOR. PROVIDE 3/4" CONDUIT BETWEEN STYLE STATIONS (HEIGHT TO BE DETERMINED BY STYLE STATION CONNECTION POINT) AND JUNCTION BOXES AS REQUIRED. PROVIDE BRANCH CIRCUITS FOR STYLE STATIONS AS INDICATED.

NOTE 4 PROVIDE JUNCTION BOX ABOVE CEILING WITH BRANCH CIRCUITS FOR WET STATIONS AND HOOD DRYERS AS INDICATED. BRANCH CIRCUITS WILL RUN DOWN WALL NEXT TO PIPE AND INSIDE NEW HALF–WALL TO EACH STATION. PROVIDE CONNECTION TO EACH UNIT AS REQUIRED.

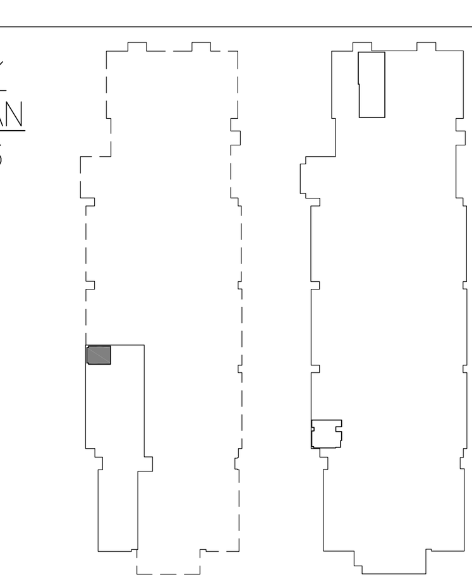
NOTE 5 ALL CIRCUIT NUMBERS REPRESENT PANEL PLDG1.

DRAWING NOTES:

EXISTING

NEW

KEY PLAN NTS



REV#: DESCRIPTION:

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ARCHITECTS & PLANNERS

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DRN BY: GW

SCALE: AS NOTED

DATE: MAY 30, 2012

PROJECT:
WALTHAM HIGH SCHOOL
CHEF'S KITCHEN, COSMETOLOGY, & TITLE IX LOCKER ROOM
617 LEXINGTON STREET
WALTHAM, MA 02452

DRAWING TITLE: NEW PARTIAL POWER PLAN - COSMETOLOGY

DRAWING NUMBER: E5.03

JOB#: 201205